Chapter 22: Mitigation

A. INTRODUCTION

The preceding chapters of this environmental impact statement (EIS) discuss the potential for significant adverse impacts to result from the proposed Cornell NYC Tech project. Where such potential impacts have been identified—in the areas of historic and cultural resources, transportation (i.e., traffic, transit [bus line haul], and pedestrian conditions), and construction (i.e., construction-period transportation and noise impacts on open space)—measures are examined to minimize or eliminate the anticipated impacts to the fullest extent practicable. These mitigation measures are discussed below.

Areas in which the proposed project would result in significant adverse impacts that cannot be fully mitigated through reasonably practicable measures are discussed in Chapter 23, "Unavoidable Adverse Impacts."

In addition, this chapter analyzes the potential effects of the proposed traffic mitigation measures on pedestrian conditions.

B. HISTORIC AND CULTURAL RESOURCES

As discussed in Chapter 7, "Historic and Cultural Resources," the Goldwater Hospital complex has been determined eligible for listing on the State/National Registers of Historic Places (S/NR-eligible). The proposed project would demolish the Goldwater Hospital complex, which would constitute a significant adverse impact on this architectural resource. ~~Cornell is consulting~~ Measures to partially mitigate significant adverse impacts to the Goldwater Hospital complex would be implemented by Cornell in consultation with the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) and the Landmarks Preservation Commission (LPC) ~~regarding appropriate measures to partially mitigate the significant adverse impact. These measures, which would include the preservation of the Works Progress Administration (WPA) murals to the extent practicable, are being developed and will be implemented by Corneall,~~ as set forth in a Letter of Resolution (LOR) ~~by~~ among Cornell, OPRHP, LPC, and the Roosevelt Island Operating Corporation (RIOC).

Mitigation measures include the following:

1. Preparation of Historic American Buildings Survey (HABS) Level II documentation of the Goldwater Hospital complex, which would include photographic documentation, historic plans, and an accompanying historical narrative.
2. Cornell has investigated the locations and conditions of the murals that were commissioned for Goldwater Hospital as part of the Federal Art Project (FAP) of the WPA. To date, Cornell has confirmed that four "abstraction" murals (works by Bolotowsky, Swinden, Rugolo, and Chanase) were installed in Goldwater Hospital, but that three of these have

been painted over. Only Ilya Bolotowsky's "Abstraction" has been previously conserved and is currently visible.

Cornell has also investigated four additional murals (works by Goldman, Haupt, and two by Browne) and determined that they are not present in Goldwater Hospital. These murals were identified by the New York City Public Design Commission as having been commissioned, but there is no record of their installation. The investigations, conducted by EverGreene Architectural Arts and meeting the American Institute for Conservation of Historic and Artistic Works (AIC) standards, did not confirm the presence of these four murals at Goldwater Hospital.

a. Cornell would prepare a report on the findings of the investigations. A copy of the report shall be provided to OPRHP and LPC for review and comment.

b. Cornell would, in consultation with OPRHP and LPC, develop and implement appropriate measures to remove and restore the four extant WPA murals to the extent practicable. Cornell would then promptly deliver all removed and restored WPA artwork to appropriate repositories, as identified in consultation with OPRHP and LPC.

c. In consultation with OPRHP and LPC, Cornell would develop a digital media display about the murals, including information obtained through Cornell's investigations of the murals. The digital media display shall be submitted to OPRHP and LPC at the preliminary and pre-final stages for OPRHP and LPC comment. The location and management of the digital exhibit would be established through ongoing consultation with OPRHP and LPC.

3. Cornell would develop and install one or more plaques or historic markers on the new academic campus that would provide information and a photograph describing and illustrating the history of the site, the Goldwater Hospital, and the WPA murals. Design for the interpretive materials shall be submitted to OPRHP and LPC at the preliminary and pre-final stages of development for OPRHP and LPC comment.

C. TRANSPORTATION

TRAFFIC

As discussed in Chapter 14, "Transportation," the proposed project would result in significant adverse traffic impacts at a number of locations in the traffic study area. This section describes the mitigation measures that could eliminate significant impacts. **Tables 22-1a** and **22-1b** summarize the significant adverse traffic impacts and identify if they could be fully or partially mitigated with the implementation of traffic improvement measures, or could not be mitigated.

Table 22-1a
Phase 1—2018 Analysis Year (2018 With Action Condition)
Traffic Impact Mitigation Summary

Intersections	AM Peak Hour	Midday Peak Hour	PM Peak Hour
No significant impact	~~7~~ 9	~~10~~ 11	10
Impact could be fully mitigated	~~6~~ 5	~~4~~ 3	4
Impact could be partially mitigated	0	0	0
Unmitigated impact	~~1~~ 0	0	0

Table 22-1b
Full Build—2038 Analysis Year (2038 With Action Condition)
Traffic Impact Mitigation Summary

Intersections	AM Peak Hour	Midday Peak Hour	PM Peak Hour
No significant impact	~~4~~ 5	7	3
Impact could be fully mitigated	~~5~~ 6	~~3~~ 5	~~7~~ 8
Impact could be partially mitigated	~~0~~ 1	0	~~0~~ 1
Unmitigated impact	~~5~~ 2	~~4~~ 2	~~4~~ 2

Details of the intersection capacity analyses and all traffic mitigation measures (e.g., signal timing changes, parking regulation changes, lane reconfigurations, etc.) are summarized in the level of service (LOS) tables presented in **Table 22-2** and **Table 22-3** at the end of the "Traffic" section.

The overall finding of the traffic mitigation analysis is that all six intersections under the 2018 With Action condition and eight of the 11 intersections under the 2038 With Action condition that would experience impacts could be fully mitigated with readily implementable traffic improvement measures, including signal timing and phasing changes, new traffic signals, parking regulation changes to gain or widen a travel lane at key intersections, and lane restriping. One additional intersection under the 2038 With Action could be partially mitigated by adjusting the traffic signal timing. These measures represent some of the standard traffic capacity improvements that are typically implemented by the New York City Department of Transportation (NYCDOT). ~~Additional review of potential mitigation measures that may fully or partially mitigate other significant impact locations that are identified as unmitigatable in this Draft EIS will be undertaken for the Final EIS.~~

The following sections describe the potential mitigation measures in detail.

PHASE 1-2018 ANALYSIS YEAR (2018 WITH ACTION CONDITION)

As shown in **Table 22-1a**, in the weekday AM peak hour, ~~seven~~ five of the 14 intersections would be impacted and could be fully mitigated ~~with the exception of one intersection~~; in the weekday midday peak hour, ~~four~~ three intersections would be impacted and could be fully mitigated; and in the weekday PM peak hour, four intersections would be impacted and could be fully mitigated.

Traffic mitigation measures needed for each intersection are described below; details of signal timing modifications are summarized in **Table 22-2a** and **Table 22-2b.**

Roosevelt Island Bridge/36th Avenue and Vernon Boulevard

Impacts on the northbound Vernon Boulevard shared left-turn/through/right-turn lane movement would occur during ~~all three peak hours. Impacts on the southbound Vernon Boulevard shared left-turn/through/right-turn movement would occur during the AM peak hour. Both conditions~~ the weekday AM and PM peak hours and could be mitigated by modifying the signal timing.

36th Avenue and 21st Street

Impacts on the eastbound 36th Avenue shared left-turn/through/right-turn movement would occur during the AM and midday peak hours. Impacts on the westbound 36th Avenue shared left-turn/through/right-turn movement would occur during the AM peak hour. Both conditions could be mitigated by modifying the signal timing.

Broadway and 21st Street

Impacts on the eastbound Broadway shared left-turn/through/right-turn movement would occur during the ~~AM, midday, and~~ PM peak hour~~s. Impacts would be experienced during the same peak hours~~ and in the westbound direction for the same movement~~s~~ during the midday and PM peak hours. Both conditions could be mitigated by modifying the signal timing.

41st Avenue and Vernon Boulevard

Impacts on the northbound Vernon Boulevard shared through/right-turn movement would occur during the PM peak hour. Impacts on the southbound Vernon Boulevard shared left-turn/through movement would occur during the AM peak hour. Both conditions could be mitigated by modifying the signal timing.

~~*Broadway and Vernon Boulevard/11th Street*~~

~~Impacts on the westbound Broadway shared left-turn/through/right-turn movement and southbound shared left-turn/through/right-turn movement would occur during the AM peak hour. These impacts are currently identified as unmitigatable, but additional review of potential mitigation measures will be undertaken for the Final EIS that may fully or partially mitigate these significant impacts.~~

Astoria Boulevard/27th Avenue/Newtown Avenue and 21st Street

Impacts on the northbound 21st Street shared left-turn/through/right-turn movement would occur during the midday and PM peak hours. Impacts on the southbound 21st Street shared left-turn/through/right-turn movement would occur during the AM and midday peak hours. Both conditions could be mitigated by modifying the signal timing~~ and signal phasing to allow an eastbound/westbound exclusive left-turn phase~~.

Hoyt Avenue South and 21st Street

Impacts on the southbound 21st Street shared left-turn/through/right-turn movement would occur during the AM peak hour and could be mitigated by modifying the signal timing and allowing through movements and left turns from the 11-foot wide exclusive left-turn lane on the eastbound approach of Hoyt Avenue South.

FULL BUILD-2038 ANALYSIS YEAR (2038 WITH ACTION CONDITION)

As shown in **Table 22-1b**, in the weekday AM peak hour, ~~10~~ nine of the 14 intersections would be impacted, ~~five~~ six of which could be fully mitigated, one could be partially mitigated, and ~~the other five~~ two could not be mitigated; in the weekday midday peak hour, seven intersections would be impacted, ~~three~~ five of which could be fully mitigated and ~~four~~ two could not be mitigated; and in the weekday PM peak hour, 11 intersections would be impacted, ~~seven~~ eight of which could be fully mitigated, one could be partially mitigated, and ~~four~~ two could not be mitigated.

Traffic mitigation measures needed for each intersection are described below; details of signal timing modifications are summarized **Table 22-3a** and **Table 22-3b**.

West Road and Main Street

Impacts on the eastbound West Road shared left-turn/right-turn movement would occur during the PM peak hour and could be mitigated by installing a traffic signal. Because installing a single traffic signal would not control all the traffic movements at this triangle-shaped

intersection, and it is desirable to eliminate the observed, illegal northbound movements occurring against southbound traffic on the north leg of the triangle, it is recommended to "normalize" this intersection to eliminate superfluous vehicular turning conflicts and pedestrian conflicts so that the south leg no longer carries vehicular traffic and is "pedestrianized." This improvement would allow vehicular and pedestrian movements to occur at the intersection of West Road and Main Street and be under the control of a single new traffic signal. This would also provide unrestricted pedestrian access to the existing triangle from west of Main Street and east of West Road. It should be noted that this would divert existing trips (mainly passenger vehicles) that use the traffic triangle as a U-turn to one block south to the traffic circle at East Road; about 80 vehicles per hour in the AM peak hour and about 40 vehicles per hour in the midday and PM peak hours would be diverted in the 2038 Full Build condition. An analysis of the Main Street at East Road/West Road traffic circle with this traffic diversion is included in the detailed level of service summary tables at the end of the chapter. The mitigation ~~currently~~ identified has been determined to be feasible. ~~will be further reviewed for the Final EIS by RIOC and NYCDOT. If the mitigation measures are not feasible, and no other measures are available to fully mitigate the impacts, the intersection may be identified as partially mitigated or unmitigatable in the Final EIS.~~

Roosevelt Island Bridge Ramp and Main Street

Impacts on the westbound Roosevelt Island Bridge Ramp shared left-turn/right-turn movement would occur during the AM peak hour. Impacts on the northbound Main Street right-turn lane would occur during the PM peak hour. Both conditions could be mitigated by installing a traffic signal. The mitigation ~~currently~~ identified has been determined to be feasible. ~~will be further reviewed for the Final EIS by RIOC and NYCDOT. If the mitigation measures are not feasible, and no other measures are available to fully mitigate the impacts, the intersection may be identified as partially mitigated or unmitigatable in the Final EIS.~~

Roosevelt Island Bridge/36th Avenue and Vernon Boulevard

Impacts on the eastbound Roosevelt Island Bridge shared through/right-turn movement would occur during the PM peak hour. Impacts on the northbound Vernon Boulevard shared left-turn/through/right-turn movement would occur during all peak hours. In the southbound direction of Vernon Boulevard, the shared left-turn/through/right-turn movement would experience impacts during the AM and PM peak hours. These impacts could be fully mitigated for the midday peak hour and partially mitigated for the AM and PM peak hours by modifying the traffic signal cycle from 60 seconds to 90 seconds. ~~are currently identified as unmitigatable, but additional review of potential mitigation measures will be undertaken for the Final EIS that may fully or partially mitigate these significant impacts.~~

36th Avenue and 21st Street

Impacts were identified on the following approaches:

- The eastbound 36th Avenue shared left-turn/through/right-turn movement during all peak hours,
- The westbound 36th Avenue shared left-turn/through/right-turn movement during all peak hours,
- The northbound 21st Street shared left-turn/through/right-turn movement during the midday peak hour, and,

- The southbound 21st Street shared left-turn/through/right-turn movement during the AM peak hour.

Overall, the impacts could be mitigated by modifying the signal timing and making the following modifications:

- Shifting the eastbound approach centerline six feet to the north and restriping the approach from one 25-foot wide travel lane to one 11-foot wide exclusive left-turn lane and one 20-foot wide shared through/right-turn lane, with parking for a distance of 200 feet back from the intersection, and
- Shifting the westbound approach centerline six feet to the south and restriping the approach from one 25-foot wide travel lane to one 11-foot wide exclusive left-turn lane and one 20-foot wide shared through/right-turn lane with parking for a distance of 125 feet back from the intersection.

Broadway and 21st Street

Impacts were identified on the following approaches:

- The eastbound Broadway shared left-turn/through/right-turn movement during all peak hours,
- The westbound Broadway shared left-turn/through/right-turn movement during all peak hours,
- The northbound 21st Street shared left-turn/through/right-turn movement during the PM peak hour, and,
- The southbound 21st Street shared left-turn/through/right-turn movement during the AM peak hour.
- ~~These impacts are currently identified as unmitigatable, but additional review of potential mitigation measures that may fully or partially mitigate these significant impacts will be undertaken for the Final EIS.~~

<u>These impacts could be fully mitigated for all peak hours with the following measures:</u>

- <u>Prohibit parking along the eastbound approach for a distance of 200 feet from the intersection (a loss of approximately five parking spaces), and along the eastbound receiving side for a distance of 250 feet from the intersection (a loss of approximately three parking spaces),</u>
- <u>Shift the eastbound approach centerline three feet to the north and restripe the approach from one 22-foot wide travel lane with parking to one 10-foot wide exclusive left-turn lane and one 15-foot wide shared through/right-turn lane for a distance of 200 feet back from the intersection,</u>
- <u>Shift the westbound approach centerline seven feet to the south and restripe the approach from one 22-foot wide travel lane with parking to one 10-foot wide exclusive left-turn lane and one 19-foot wide shared through/right-turn lane with parking for a distance of 250 feet back from the intersection, and</u>
- <u>Modify the signal timing.</u>

36th Avenue and 31st Street

Impacts on the eastbound 36th Avenue shared left-turn/through/right-turn movement would occur during the midday and PM peak hours and could be mitigated by modifying the signal timing.

41st Avenue and Vernon Boulevard

Impacts on the northbound Vernon Boulevard shared through/right-turn movement would occur during the PM peak hour. Impacts on the southbound Vernon Boulevard shared left-turn/through movement would occur during the AM and PM peak hour. Both conditions could be mitigated by modifying the signal timing.

~~*30th Avenue and 21st Street*~~

~~An impact on the southbound 21st Street shared left-turn/through/right-turn movement would occur during the AM peak hour. This impact is currently identified as unmitigatable, but additional review of potential mitigation measures that may fully or partially mitigate the significant impact will be undertaken for the Final EIS.~~

Broadway and Vernon Boulevard/11th Street

Impacts on the westbound Broadway shared left-turn/through/right-turn movement would occur during all peak hours. Impacts on the southbound Vernon Boulevard shared left-turn/through/right-turn movement would occur during the AM and PM peak hours. These impacts could not be mitigated. ~~are currently identified as unmitigatable, but additional review of potential mitigation measures that may fully or partially mitigate these significant impacts will be undertaken for the Final EIS.~~

Astoria Boulevard/27th Avenue/Newtown Avenue and 21st Street

Impacts were identified on the following approaches:

- The eastbound Astoria Boulevard shared through/right-turn lane during the AM and PM peak hours,
- The westbound Astoria Boulevard shared through/right-turn lane during the PM peak hour,
- The northbound 21st Street shared left-turn/through/right-turn movement during the AM and midday peak hours,
- The northbound 21st Street shared through/right-turn lane during the PM peak hour, and
- The southbound 21st Street shared left-turn/through/right-turn movement during all peak hours.

Overall, the intersection could be mitigated ~~by modifying the signal timing and signal phasing to allow an eastbound/westbound exclusive left-turn phase.~~ with the following measures:

- Prohibit parking along the southbound approach for a distance of 100 feet from the intersection (a loss of approximately four parking spaces),
- Restripe the northbound approach from one 11-ft shared left-through lane and one 20-ft shared through-right lane with parking to one 11-ft shared left-through lane, one 10-ft travel lane, and one 10-ft parking lane which would serve as a right turn lane during the weekday PM peak period. Prohibit parking on the northbound approach for 100 feet from the intersection (a loss of approximately three parking spaces).
- Shift the southbound approach centerline two feet to the east and restripe the approach from one 11-foot wide shared left-turn/through lane and one 19-foot wide shared through/right-turn lane with parking to one 11-foot wide shared left-turn/through lane, one 10-foot wide travel lane, and one 11-foot wide parking lane which would serve as a right turn lane during the weekday AM and PM peak periods, and
- Modify the signal timing.

Hoyt Avenue North and 21st Street

Impacts were identified on the following approaches:

- The westbound Hoyt Avenue North left-turn lane during all peak hours,
- The northbound 21st Street through lane during the AM and PM peak hours, and
- The southbound 21st Street shared through/right-turn lane during the AM ~~and PM~~ peak hour~~s~~.
- ~~These impacts are currently identified as unmitigatable, but additional review of potential mitigation measures that may fully or partially mitigate these significant impacts will be undertaken for the Final EIS.~~

These impacts could not be mitigated.

Hoyt Avenue South and 21st Street

Impacts on the northbound 21st Street shared left-turn/through/right-turn movement would occur during the ~~AM and~~ PM peak hour~~s~~. Impacts on the southbound 21st Street shared left-turn/through/right-turn movement would occur during the AM and PM peak hours. Both conditions could be mitigated by modifying the signal timing and allowing through movements and left turns from the 11-foot wide exclusive left-turn lane on the eastbound approach of Hoyt Avenue South.

CONCLUSION

The overall finding of the traffic mitigation analysis is that all ~~but one~~ of the 14 intersections analyzed under the 2018 With Action condition and all but ~~five~~ three under the 2038 With Action condition would either not be significantly impacted or could be fully mitigated with readily implementable traffic improvement measures, including signal timing and phasing changes, new traffic signals, parking regulation changes to gain or widen a travel lane at key intersections, and lane restriping. One additional intersection under the 2038 With Action could be partially mitigated by adjusting the traffic signal timing.~~Additional review of potential mitigation measures that may fully or partially mitigate the significant impacts that are identified as unmitigatable will be undertaken for the Final EIS.~~

The implementation of these measures would result in the loss of approximately 12 to 18 parking spaces during various times of the day and days of the week. Broadway would lose up to eight parking spaces between Vernon Boulevard and 23rd Street and 21st Street would lose up to seven parking spaces between Astoria Boulevard and 24th Road. No designated truck loading/unloading zones or bus layover spaces would be affected by the proposed parking modifications for mitigation. If it is determined that on-street parking should be retained at locations where such mitigation was assumed, additional unmitigated traffic impacts would result.

Table 22-2a
2018 No Action, With Action, and Mitigated Traffic Levels of Service Comparison
(Unsignalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
AM Peak Hour														
1. EAST/WEST MAIN STREET & MAIN STREET														
West Road	EB	LT	-	7.1	A	LT	-	7.4	A	-	-	-	-	-Mitigation not required.
Main Street	SB	LR	-	7.3	A	LR	-	8.3	A	-	-	-	-	
	Overall Intersection		-	**7.3**	**A**	**-**	**-**	**8.3**	**A**	**-**	-	-	-	
2. WEST ROAD & MAIN STREET														
West Road	EB	LR	-	9.1	A	LR	-	10.4	B	-	-	-	-	-Mitigation not required.
West Road (south of island)	EB	LR	-	11.3	B	LR	-	12.5	B	-	-	-	-	
Main Street	NB	LT	-	9.9	A	LT	-	10.6	B	-	-	-	-	
	SB	TR	-	9.3	A	TR	-	11.7	B	-	-	-	-	
	Overall Intersection		-	**9.8**	**A**	**-**	**-**	**11.3**	**B**	**-**	-	-	-	
3. ROOSEVELT ISLAND BRIDGE RAMP & MAIN STREET														
Roosevelt Island Bridge Ramp	WB	LR	-	14.6	B	LR	-	23.2	C	-	-	-	-	-Mitigation not required.
Main Street	NB	T	-	10.2	B	T	-	10.7	B	-	-	-	-	
		R	-	10.8	B	R	-	13.2	B	-	-	-	-	
	SB	LT	-	12.2	B	LT	-	13.5	B	-	-	-	-	
	Overall Intersection		-	**12.8**	**B**	**-**	**-**	**18.0**	**C**	**-**	-	-	-	
4. ROOSEVELT ISLAND BRIDGE & MOTORGATE GARAGE ENTRANCE / EXIT														
Roosevelt Island Bridge	EB	LT	-	8.4	A	LT	-	8.8	A	-	-	-	-	-Mitigation not required.
Motorgate Garage Exit	NB	LR	-	11.2	B	LR	-	11.9	B	-	-	-	-	
	Overall Intersection		-	**1.4**	**A**	**-**	**-**	**1.4**	**A**	**-**	-	-	-	
Midday Peak Hour														
1. EAST/WEST MAIN STREET & MAIN STREET														
West Road	EB	LT	-	7.6	A	LT	-	7.9	A	-	-	-	-	-Mitigation not required.
Main Street	SB	LR	-	7.3	A	LR	-	8.3	A	-	-	-	-	
	Overall Intersection		-	**7.4**	**A**	**-**	**-**	**8.2**	**A**	**-**	-	-	-	
2. WEST ROAD & MAIN STREET														
West Road	EB	LR	-	8.4	A	LR	-	10.1	B	-	-	-	-	-Mitigation not required.
West Road (south of island)	EB	LR	-	10.7	B	LR	-	11.9	B	-	-	-	-	
Main Street	NB	LT	-	9.2	A	LT	-	10.1	B	-	-	-	-	
	SB	TR	-	8.6	A	TR	-	10.8	B	-	-	-	-	
	Overall Intersection		-	**9.2**	**A**	**-**	**-**	**10.6**	**B**	**-**	-	-	-	
3. ROOSEVELT ISLAND BRIDGE RAMP & MAIN STREET														
Roosevelt Island Bridge Ramp	WB	LR	-	10.1	B	LR	-	13.7	B	-	-	-	-	-Mitigation not required.
Main Street	NB	T	-	9.2	A	T	-	9.8	A	-	-	-	-	
		R	-	9.0	A	R	-	11.4	B	-	-	-	-	
	SB	LT	-	10.5	B	LT	-	11.7	B	-	-	-	-	
	Overall Intersection		-	**9.8**	**A**	**-**	**-**	**12.2**	**B**	**-**	-	-	-	
4. ROOSEVELT ISLAND BRIDGE & MOTORGATE GARAGE ENTRANCE / EXIT														
Roosevelt Island Bridge	EB	LT	-	7.7	A	LT	-	7.9	A	-	-	-	-	-Mitigation not required.
Motorgate Garage Exit	NB	LR	-	9.9	A	LR	-	10.6	B	-	-	-	-	
	Overall Intersection		-	**0.9**	**A**	**-**	**-**	**0.7**	**A**	**-**	-	-	-	
PM Peak Hour														
1. EAST/WEST MAIN STREET & MAIN STREET														
West Road	EB	LT	-	7.4	A	LT	-	7.6	A	-	-	-	-	-Mitigation not required.
Main Street	SB	LR	-	7.2	A	LR	-	8.0	A	-	-	-	-	
	Overall Intersection		-	**7.3**	**A**	**-**	**-**	**7.9**	**A**	**-**	-	-	-	
2. WEST ROAD & MAIN STREET														
West Road	EB	LR	-	8.7	A	LR	-	13.0	B	-	-	-	-	-Mitigation not required.
West Road (south of island)	EB	LR	-	10.6	B	LR	-	11.4	B	-	-	-	-	
Main Street	NB	LT	-	9.9	A	LT	-	11.9	B	-	-	-	-	
	SB	TR	-	8.7	A	TR	-	11.1	B	-	-	-	-	
	Overall Intersection		-	**9.6**	**A**	**-**	**-**	**12.0**	**B**	**-**	-	-	-	

Table 22-2a (cont'd)
2018 No Action, With Action, and Mitigated Traffic Levels of Service Comparison
(Unsignalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
PM Peak Hour (continued)														
3. ROOSEVELT ISLAND BRIDGE RAMP & MAIN STREET														
Roosevelt Island Bridge Ramp	WB	LR	-	11.0	B	LR	-	13.9	B	-	-	-	-	-Mitigation not required.
Main Street	NB	T	-	9.6	A	T	-	10.1	B	-	-	-	-	
		R	-	9.6	A	R	-	13.0	B	-	-	-	-	
	SB	LT	-	14.2	B	LT	-	16.7	C	-	-	-	-	
	Overall Intersection		-	**11.9**	**B**	**-**	**-**	**14.4**	**B**	**-**	-	-	-	
4. ROOSEVELT ISLAND BRIDGE & MOTORGATE GARAGE ENTRANCE / EXIT														
Roosevelt Island Bridge	EB	LT	-	7.9	A	LT	-	8.1	A	-	-	-	-	-Mitigation not required.
Motorgate Garage Exit	NB	LR	-	12.5	B	LR	-	14.3	B	-	-	-	-	
	Overall Intersection		-	**1.0**	**A**	**-**	**-**	**0.9**	**A**	-	-	-	-	

Notes:
(1) Control delay is measured in seconds per vehicle.
(2) Overall intersection V/C ratio is the critical lane groups' V/C ratio.

Table 22-2b
2018 No Action, With Action and Mitigated Traffic Levels of Service Comparison (Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
AM Peak Hour														
5. ROOSEVELT ISLAND BRIDGE / 36TH AVENUE & VERNON BOULEVARD														
Roosevelt Island Bridge	EB	L	0.29	13.0	B	L	0.34	13.8	B	L	0.38	15.7	B	-Modify signal timing: shift ~~4~~ 2 s green time from EB/WB phase to NB/SB phase [EB/WB green time shifts from 25 s to ~~21~~ 23 s; NB/SB green time shifts from 25 s to ~~29~~ 27 s].
		TR	0.59	16.9	B	TR	0.67	19.0	B	TR	0.73	22.6	C	
36th Avenue	WB	LTR	0.37	13.7	B	LTR	0.44	14.7	B	LTR	0.50	17.1	B	
Vernon Boulevard	NB	LTR	~~1.12~~ 0.92	~~75.0~~ 20.4	~~E~~ C	LTR	~~1.38~~ 1.12	~~188.5~~ 75.7	~~F*~~ E	LTR	1.00	29.1	C	
	SB	LTR	~~1.06~~ 0.89	~~57.4~~ 23.2	~~E~~ C	LTR	~~1.10~~ 0.92	~~71.1~~ 26.5	~~E*~~ C	LTR	0.85	19.0	B	
	Overall Intersection		**~~0.85~~ 0.76**	**~~45.5~~ 19.2**	**~~D~~ B**	**-**	**~~1.02~~ 0.90**	**~~77.4~~ 34.8**	**~~E~~ C**	**-**	**~~0.88~~**	**~~21.8~~**	**~~C~~**	
6. 36TH AVENUE & 21ST STREET														
36th Avenue	EB	LTR	0.73	44.1	D	LTR	0.90	58.2	E*	LTR	0.83	49.0	D	-Modify signal timing: shift 2 s green time from NB/SB phase to EB/WB phase [EB/WB green time shifts from 37 s to 39 s; NB/SB green time shifts from 73 s to 71 s].
	WB	LTR	0.91	48.0	D	LTR	0.97	55.6	E*	LTR	0.91	46.1	D	
21st Street	NB	LTR	0.34	12.2	B	LTR	0.34	12.2	B	LTR	0.35	13.3	B	
	SB	LTR	0.98	28.9	C	LTR	1.00	33.4	C	LTR	1.03	43.4	D	
	Overall Intersection		**0.96**	**29.6**	**C**	**-**	**0.99**	**35.0**	**D**	**-**	**0.99**	**38.8**	**D**	
7. BROADWAY & 21ST STREET														
Broadway	EB	LTR	~~0.98~~ 0.84	~~78.6~~ 55.7	E	LTR	~~1.00~~ 0.85	~~82.6~~ 57.1	~~F*~~ E	~~LTR~~	~~0.96~~	~~72.8~~	~~E~~	~~-Mitigation not required. -Modify signal timing: shift 1 s green time from NB/SB phase to EB/WB phase [EB/WB green time shifts from 31 s to 32 s; NB/SB green time shifts from 69 s to 68 s].~~
	WB	LTR	~~0.97~~ 0.87	~~69.5~~ 54.6	~~E~~ D	LTR	~~1.00~~ 0.89	~~74.9~~ 56.5	~~E*~~ E	~~LTR~~	~~0.95~~	~~63.6~~	~~E~~	
21st Street	NB	LTR	~~0.48~~ 0.46	~~15.9~~ 15.7	B	LTR	~~0.49~~ 0.47	~~16.0~~ 15.8	B	~~LTR~~	~~0.50~~	~~16.7~~	~~B~~	
	SB	LTR	~~0.99~~ 0.95	~~32.7~~ 27.9	C	LTR	~~1.01~~ 0.97	~~38.6~~ 29.7	~~D~~ C	~~LTR~~	~~1.03~~	~~43.7~~	~~D~~	
	Overall Intersection		**~~0.98~~ 0.93**	**~~36.5~~ 29.7**	**~~D~~ C**	**-**	**~~1.01~~ 0.94**	**~~40.7~~ 31.1**	**~~D~~ C**	**-**	**~~1.00~~**	**~~41.7~~**	**~~D~~**	
8. 36TH AVENUE & 31ST STREET														
36th Avenue	EB	LTR	0.68	32.0	C	LTR	0.70	32.7	C	-	-	-	-	-Mitigation not required.
	WB	LTR	0.68	30.3	C	LTR	0.70	31.0	C	-	-	-	-	
31st Street	NB	LTR	0.63	17.5	B	LTR	0.66	18.5	B	-	-	-	-	
	SB	LTR	0.65	17.6	B	LTR	0.65	17.6	B	-	-	-	-	
	Overall Intersection		**0.66**	**22.5**	**C**	**-**	**0.68**	**23.1**	**C**	**-**	**-**	**-**	**-**	
9. **41ST AVENUE & VERNON BOULEVARD**														
41st Avenue	WB	LR	0.26	16.0	B	LR	0.27	16.1	B	LR	0.30	17.8	B	-Modify signal timing: shift ~~1.8~~ 2 s green time from WB phase to NB/SB phase [NB/SB green time shifts from ~~31.8~~ 32 s to ~~33.6~~ 34 s; WB green time shifts from ~~19.8~~ 20 s to 18 s].
Vernon Boulevard	NB	TR	0.65	13.1	B	TR	0.69	14.0	B	TR	0.65	12.0	B	
	SB	LT	1.06	46.1	D	LT	1.09	57.7	E*	LT	1.03	34.9	C	
	Overall Intersection		**0.75**	**31.7**	**C**	**-**	**0.77**	**38.2**	**D**	**-**	**0.77**	**25.1**	**C**	
10. **30TH AVENUE & 21ST STREET**														
30th Avenue	EB	LTR	0.47	37.8	D	LTR	0.47	37.8	D	-	-	-	-	-Mitigation not required.
	WB	LTR	0.72	46.2	D	LTR	0.72	46.4	D	-	-	-	-	
21st Street	NB	LTR	~~0.51~~ 0.44	~~14.5~~ 13.4	B	LTR	~~0.52~~ 0.45	~~14.6~~ 13.6	B	-	-	-	-	
	SB	LTR	~~1.00~~ 0.91	~~30.9~~ 22.3	C	LTR	~~1.01~~ 0.93	~~34.4~~ 22.9	C	-	-	-	-	
	Overall Intersection		**~~0.90~~ 0.85**	**~~28.3~~ 23.0**	**C**	**-**	**~~0.91~~ 0.86**	**~~30.3~~ 23.4**	**C**	**-**	**-**	**-**	**-**	

Table 22-2b (cont'd)
2018 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
AM Peak Hour (continued)														
11. **BROADWAY & VERNON BOULEVARD / 11TH STREET**														
Park Entrance	EB	LTR	0.01	~~28.2~~ 28.0	C	LTR	0.01	~~28.2~~ 28.0	C	-	-	-	-	-Mitigation not required. ~~Unmitigatable Impacts~~
Broadway	WB	LTR	~~1.04~~ 0.82	~~62.8~~ 57.9	E	LTR	~~1.06~~ 0.84	~~71.8~~ 60.1	E*	-	-	-	-	
Vernon Boulevard	NB	LT	0.25	~~7.9~~ 2.2	A	LT	0.25	~~7.9~~ 2.2	A	-	-	-	-	
		R	0.04	~~6.4~~ 1.1	A	R	0.05	~~6.4~~ 1.1	A	-	-	-	-	
	SB	LTR	~~1.02~~ 0.93	~~58.3~~ 52.2	~~E~~ D	LTR	~~1.04~~ 0.95	~~65.0~~ 56.4	E*	-	-	-	-	
11th Street	NB	LTR	~~0.38~~ 0.37	~~41.2~~ 42.1	D	LTR	~~0.38~~ 0.37	~~41.2~~ 42.1	D	-	-	-	-	
	Overall Intersection		~~**1.01**~~ -	~~**47.6**~~ **40.4**	**D**	**-**	~~**1.03**~~ -	~~**52.9**~~ **42.7**	**D**	-	-	-	-	
12. ASTORIA BOULEVARD / 27TH AVENUE / NEWTOWN AVENUE & 21ST STREET														
Astoria Boulevard	EB	L	~~0.84~~ 0.78	~~61.6~~ 56.4	E	L	~~0.84~~ 0.78	~~61.6~~ 56.4	E	L	~~0.78~~ 0.81	~~48.7~~ 60.1	~~D~~ E	-Modify signal timing: shift 1 s green time from the EB phase to the NB/SB phase [EB phase green time shifts from 25 s to 24 s; NB/SB green time shifts from 50 s to 51 s; WB green time remains the same]. ~~-Modify signal phasing: Add a new lag phase for the EB/WB exclusive left turns. The existing signal phasing [WB has 30 s green time; EB has 25 s green time; NB/SB has 50 s green time] would be modified to have the following: EB/WB will have 39 s green time; EB/WB exclusive left-turn phase will have 10 s green time; NB/SB will have 56 s green time [each phase will have 3 s amber and 2 s all red].~~
		TR	~~0.86~~ 0.82	~~54.6~~ 52.4	D	TR	~~0.87~~ 0.83	~~55.4~~ 53.0	~~E~~ D	TR	~~0.55~~ 0.87	~~34.6~~ 56.2	~~C~~ E	
	WB	L	0.98	63.8	E	L	0.98	63.8	E	L	~~0.99~~ 0.98	~~59.8~~ 63.8	E	
		TR	~~0.86~~ 0.84	~~46.8~~ 45.9	D	TR	~~0.86~~ 0.84	~~47.0~~ 46.1	D	TR	~~0.65~~ 0.84	~~35.7~~ 46.1	~~D~~ D	
21st Street	NB	LTR	~~0.86~~ 0.82	~~39.2~~ 36.7	D	LTR	~~0.89~~ 0.86	~~42.1~~ 38.8	D	LTR	~~0.74~~ 0.83	~~29.2~~ 36.2	~~C~~ D	
	SB	LTR	1.08	~~72.0~~ 70.9	E	LTR	1.10	~~81.6~~ 80.4	F*	LTR	~~0.99~~ 1.08	~~35.7~~ 70.4	~~D~~ E	
	Overall Intersection		~~**1.00**~~ **0.99**	~~**58.7**~~ **57.2**	**E**	**-**	~~**1.01**~~ **1.00**	~~**63.0**~~ **61.4**	**E**	**-**	~~**0.99**~~ **1.00**	~~**37.7**~~ **57.7**	~~**D**~~ **E**	
13. HOYT AVENUE NORTH & 21ST STREET														
Hoyt Avenue North	EB	L	0.02	40.4	D	L	0.02	40.4	D	-	-	-	-	-Mitigation not required.
		R	0.37	47.5	D	R	0.37	47.5	D	-	-	-	-	
	WB	L	0.90	44.1	D	L	0.92	45.8	D	-	-	-	-	
		TR	0.25	14.8	B	TR	0.25	14.8	B	-	-	-	-	
21st Street	NB	L	0.30	31.5	C	L	0.30	31.7	C	-	-	-	-	
		T	1.04	85.7	F	T	1.04	85.7	F	-	-	-	-	
	SB	TR	1.00	53.9	D	TR	1.01	55.8	E	-	-	-	-	
	Overall Intersection		**0.85**	**53.1**	**D**	**-**	**0.86**	**54.2**	**D**		**-**	**-**	**-**	
14. HOYT AVENUE SOUTH & 21ST STREET														
Hoyt Avenue South	EB	L	0.13	30.0	C	L	0.13	30.0	C	LTR	0.61	36.2	D	-Restripe EB approach of Hoyt Avenue South from one 11-ft exclusive left-turn lane and one 11-ft shared through-right lane to two 11-ft shared left-through-right lanes for 250 ft. -Modify signal timing: shift 1 s green time from EB phase to NB/SB phase [EB green time shifts from 37 s to 36 s; NB/SB green time shifts from 73 s to 74 s].
		TR	1.06	75.0	E	TR	1.06	75.0	E	-	-	-	-	
21st Street	NB	LTR	0.55	15.1	B	LTR	0.55	15.2	B	LTR	0.54	14.6	B	
	SB	LTR	1.03	46.1	D	LTR	1.05	52.3	D*	LTR	1.03	45.5	D	
	Overall Intersection		**1.04**	**42.3**	**D**	**-**	**1.05**	**45.7**	**D**	**-**	**0.89**	**35.5**	**D**	

Table 22-2b (cont'd)
2018 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
Midday Peak Hour														
5. ROOSEVELT ISLAND BRIDGE / 36TH AVENUE & VERNON BOULEVARD														
Roosevelt Island Bridge	EB	L	0.22	12.4	B	L	0.28	13.1	B	~~L~~	~~0.34~~	~~17.0~~	~~B~~	~~-~~Mitigation not required. ~~-Modify signal timing: shift 4 s green time from EB/WB phase to NB/SB phase [EB/WB green time shifts from 25 s to 21 s; NB/SB green time shifts from 25 s to 29 s].~~
		TR	0.41	14.3	B	TR	0.53	16.3	B	~~TR~~	~~0.64~~	~~22.0~~	~~C~~	
36th Avenue	WB	LTR	0.33	13.5	B	LTR	0.44	15.1	B	~~LTR~~	~~0.57~~	~~21.3~~	~~C~~	
Vernon Boulevard	NB	LTR	~~0.89~~ 0.78	~~26.6~~ 19.7	~~C~~ B	LTR	~~1.06~~ 0.93	~~62.9~~ 30.3	~~E*~~ C	~~LTR~~	~~0.88~~	~~22.7~~	C	
	SB	LTR	0.68	19.0	B	LTR	0.72	20.3	C	~~LTR~~	~~0.62~~	~~14.6~~	~~B~~	
	Overall Intersection		**~~0.65~~ 0.59**	**~~19.4~~ 17.2**	**B**	**-**	**~~0.80~~ 0.73**	**~~31.1~~ 21.2**	**C**	**-**	**~~0.78~~**	**~~19.8~~**	**~~B~~**	
6. 36TH AVENUE & 21ST STREET														
36th Avenue	EB	LTR	0.78	46.5	D	LTR	0.97	71.5	**E***	LTR	0.84	47.9	D	-Modify signal timing: shift 4 s green time from NB/SB phase to EB/WB phase [EB/WB green time shifts from 37 s to 41 s; NB/SB green time shifts from 73 s to 69 s].
	WB	LTR	0.86	50.5	D	LTR	0.89	53.7	D	LTR	0.78	42.3	D	
21st Street	NB	LTR	0.67	17.3	B	LTR	0.79	21.5	C	LTR	0.85	27.0	C	
	SB	LTR	0.61	16.1	B	LTR	0.62	16.5	B	LTR	0.66	19.5	B	
	Overall Intersection		**0.73**	**24.2**	**C**	**-**	**0.85**	**29.7**	**C**	**-**	**0.85**	**28.8**	**C**	
7. BROADWAY & 21ST STREET														
Broadway	EB	LTR	~~0.95~~ 0.83	~~64.9~~ 51.4	~~E~~ D	LTR	~~0.98~~ 0.86	~~71.5~~ 53.1	~~E*~~ D	LTR	~~0.95~~ 0.83	~~63.7~~ 50.4	~~E~~ D	-Modify signal timing: shift 1 s green time from NB/SB phase to EB/WB phase [EB/WB green time shifts from 31 s to 32 s; NB/SB green time shifts from 69 s to 68 s].
	WB	LTR	~~1.01~~ 0.99	~~77.1~~ 71.9	E	LTR	~~1.02~~ 1.00	~~80.7~~ 76.1	~~F*~~ E*	LTR	~~0.97~~ 0.95	~~66.9~~ 63.8	E	
21st Street	NB	LTR	~~0.78~~ 0.76	~~22.2~~ 21.5	C	LTR	~~0.80~~ 0.77	~~22.7~~ 21.9	C	LTR	~~0.81~~ 0.79	~~23.7~~ 22.9	C	
	SB	LTR	~~0.74~~ 0.69	~~21.2~~ 19.8	~~C~~ B	LTR	~~0.78~~ 0.71	~~22.5~~ 20.4	C	LTR	~~0.79~~ 0.72	~~23.5~~ 21.2	C	
	Overall Intersection		**~~0.85~~ 0.83**	**~~32.7~~ 29.7**	**C**	**-**	**~~0.87~~ 0.85**	**~~34.5~~ 30.7**	**C**	**-**	**~~0.86~~ 0.84**	**~~32.9~~ 29.8**	**C**	
8. 36TH AVENUE & 31ST STREET														
36th Avenue	EB	LTR	0.81	35.8	D	LTR	0.82	36.8	D	-	-	-	-	-Mitigation not required.
	WB	LTR	0.74	33.2	C	LTR	0.76	34.1	C	-	-	-	-	
31st Street	NB	LTR	0.57	16.2	B	LTR	0.57	16.2	B	-	-	-	-	
	SB	LTR	0.48	14.4	B	LTR	0.48	14.4	B	-	-	-	-	
	Overall Intersection		**0.66**	**23.9**	**C**	**-**	**0.67**	**24.4**	**C**	**-**	**-**	**-**	**-**	
9. **41ST AVENUE & VERNON BOULEVARD**														
41st Avenue	WB	LR	0.18	15.2	B	LR	0.18	15.2	B	LR	0.20	16.7	B	-Mitigation not required. -Modify signal timing: shift ~~1.8~~ 2 s green time from WB phase to NB/SB phase [NB/SB green time shifts from ~~31.8~~ 32 s ~~to~~ ~~33.6~~ 34 s; WB green time shifts from ~~19.8~~ 20 s to 18 s]. [Measures reflect improvements needed for the weekday AM and PM peak periods.]
Vernon Boulevard	NB	TR	0.66	13.6	B	TR	0.70	14.4	B	TR	0.66	12.3	B	
	SB	LT	0.64	13.2	B	LT	0.68	14.0	B	LT	0.64	12.1	B	
	Overall Intersection		**0.48**	**13.6**	**B**	**-**	**0.50**	**14.3**	**B**	**-**	**0.50**	**12.5**	**B**	
10. **30TH AVENUE & 21ST STREET**														
30th Avenue	EB	LTR	0.33	34.4	C	LTR	0.33	34.4	C	-	-	-	-	-Mitigation not required.
	WB	LTR	0.50	38.9	D	LTR	0.50	38.9	D	-	-	-	-	
21st Street	NB	LTR	0.72	18.6	B	LTR	0.73	19.1	B	-	-	-	-	
	SB	LTR	0.78	20.0	B	LTR	0.80	20.7	C	-	-	-	-	
	Overall Intersection		**0.68**	**21.5**	**C**	**-**	**0.70**	**21.9**	**C**	**-**	**-**	**-**	**-**	

Table 22-2b (cont'd)
2018 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
Midday Peak Hour (continued)														
11. **BROADWAY & VERNON BOULEVARD / 11TH STREET**														
Park Entrance	EB	LTR	0.02	~~26.2~~ 27.0	C	LTR	0.02	~~26.2~~ 27.0	C	-	-	-	-	-Mitigation not required.
Broadway	WB	LTR	~~0.89~~ 0.82	~~47.0~~ 53.8	D	LTR	~~0.91~~ 0.84	~~49.2~~ 55.0	D	-	-	-	-	
Vernon Boulevard	NB	LT	0.26	~~8.3~~ 2.7	A	LT	0.27	~~8.4~~ 2.8	A	-	-	-	-	
		R	0.17	~~7.6~~ 2.8	A	R	0.18	~~7.6~~ 2.9	A	-	-	-	-	
	SB	LTR	~~0.56~~ 0.63	~~27.2~~ 31.5	C	LTR	~~0.57~~ 0.65	~~27.7~~ 32.3	C	-	-	-	-	
11th Street	NB	LTR	~~0.22~~ 0.21	~~32.9~~ 34.0	C	LTR	0.22	~~32.9~~ 33.6	C	-	-	-	-	
	Overall Intersection		**~~0.72~~ -**	**~~25.6~~ 26.2**	**C**	**-**	**~~0.74~~ -**	**~~26.3~~ 26.6**	**C**	**-**	-	-	-	
12. ASTORIA BOULEVARD / 27TH AVENUE / NEWTOWN AVENUE & 21ST STREET														
Astoria Boulevard	EB	L	0.26	34.9	C	L	0.26	34.9	C	L	~~0.26~~ 0.27	~~24.0~~ 35.8	~~C~~ D	-Modify signal timing: shift 1 s green time from the EB phase to the NB/SB phase [EB phase green time shifts from 34 s to 33 s; NB/SB green time shifts from 37 s to 38 s; WB green time remains the same]. ~~-Modify signal phasing: Add a new lag phase for the EB/WB exclusive left turns. The existing signal phasing [WB has 34 s green time; EB has 34 s green time; NB/SB has 37 s green time] would be modified to have the following: EB/WB will have 39 s green time; EB/WB exclusive left-turn phase will have 10 s green time; NB/SB will have 56 s green time [each phase will have 3 s amber and 2 s all red].~~
		TR	~~0.40~~ 0.39	~~36.3~~ 36.2	D	TR	~~0.41~~ 0.40	~~36.5~~ 36.3	D	TR	~~0.36~~ 0.41	~~32.0~~ 37.3	~~C~~ D	
	WB	L	0.86	53.0	D	L	0.86	53.0	D	L	~~0.87~~ 0.86	~~47.3~~ 53.0	D	
		TR	0.43	~~36.2~~ 36.1	D	TR	0.44	~~36.3~~ 36.2	D	TR	~~0.38~~ 0.44	~~31.9~~ 36.2	~~C~~ D	
21st Street	NB	LTR	1.13	102.1	F	LTR	1.17	121.8	F*	LTR	~~0.67~~ 1.13	~~25.2~~ 100.2	~~C~~ F	
	SB	LTR	1.00	56.1	E	LTR	1.04	65.9	E*	LTR	~~0.68~~ 1.01	~~25.5~~ 56.6	~~C~~ F	
	Overall Intersection		**~~0.81~~ 0.80**	**~~63.9~~ 64.0**	**E**		**0.82**	**~~73.0~~ 73.1**	**E**	**-**	**~~0.79~~ 0.82**	**~~29.4~~ 63.8**	**~~C~~ E**	
13. HOYT AVENUE NORTH & 21ST STREET														
Hoyt Avenue North	EB	L	0.11	42.0	D	L	0.11	42.0	D	-	-	-	-	--Mitigation not required
		R	0.13	42.5	D	R	0.13	42.5	D	-	-	-	-	
	WB	L	0.69	38.5	D	L	0.72	39.3	D	-	-	-	-	
		TR	0.17	14.2	B	TR	0.17	14.2	B	-	-	-	-	
21st Street	NB	L	0.11	25.2	C	L	0.11	25.2	C	-	-	-	-	
		T	0.77	43.0	D	T	0.77	43.1	D	-	-	-	-	
	SB	TR	0.57	33.4	C	TR	0.58	33.5	C	-	-	-	-	
	Overall Intersection		**0.61**	**36.6**	**D**	**-**	**0.62**	**37.1**	**D**	**-**	**-**	**-**	**-**	
14. HOYT AVENUE SOUTH & 21ST STREET														
Hoyt Avenue South	EB	L	0.21	31.6	C	L	0.21	31.6	C	LTR	0.32	32.8	C	-Mitigation not required. -Restripe EB approach of Hoyt Avenue South from one 11-ft exclusive left-turn lane and one 11-ft shared through-right lane to two 11-ft shared left-through-right lanes for 250 ft. [Measures reflect improvements needed for the weekday AM peak period.]
		TR	0.41	35.5	D	TR	0.41	35.5	D	-	-	-	-	
21st Street	NB	LTR	0.43	13.3	B	LTR	0.44	13.4	B	LTR	0.44	13.4	B	
	SB	LTR	0.61	15.9	B	LTR	0.62	16.2	B	LTR	0.62	16.2	B	
	Overall Intersection		**0.54**	**17.8**	**B**	**-**	**0.55**	**17.9**	**B**	**-**	**0.52**	**17.7**	**B**	

Table 22-2b (cont'd)
2018 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
PM Peak Hour														
5. ROOSEVELT ISLAND BRIDGE / 36TH AVENUE & VERNON BOULEVARD														
Roosevelt Island Bridge	EB	L	0.46	14.3	B	L	0.51	15.1	B	L	~~0.60~~ 0.58	~~19.5~~ 18.3	B	-Modify signal timing: shift ~~4~~ 3 s green time from EB/WB phase to NB/SB phase [EB/WB green time shifts from 25 s to ~~21~~ 22 s; NB/SB green time shifts from 25 s to ~~29~~ 28 s].
		TR	0.59	15.6	B	TR	0.78	19.8	B	TR	~~0.92~~ 0.88	~~33.2~~ 27.9	C	
36th Avenue	WB	LTR	0.28	12.8	B	LTR	0.34	13.6	B	LTR	~~0.50~~ 0.44	~~20.3~~ 18.0	~~C~~ B	
Vernon Boulevard	NB	LTR	~~1.15~~ 1.15	~~88.6~~ 86.8	~~F~~ F	LTR	~~1.39~~ 1.20+	~~194.5~~ 192.0	F*	LTR	~~1.10~~ 1.16	~~63.5~~ 88.5	~~E~~ F	
	SB	LTR	0.85	25.3	C	LTR	0.87	27.4	C	LTR	~~0.75~~ 0.78	~~17.5~~ 19.2	B	
	Overall Intersection		**0.88**	**~~42.8~~ 42.2**	**D**	**-**	**1.09**	**~~77.4~~ 76.6**	**E**	**-**	**~~1.03~~ 1.04**	**~~36.4~~ 43.4**	**D**	
6. 36TH AVENUE & 21ST STREET														
36th Avenue	EB	LTR	0.51	35.1	D	LTR	0.78	42.0	D	-	-	-	-	-Mitigation not required.
	WB	LTR	0.79	45.5	D	LTR	0.83	48.4	D	-	-	-	-	
21st Street	NB	LTR	0.92	24.8	C	LTR	0.92	24.8	C	-	-	-	-	
	SB	LTR	0.69	17.8	B	LTR	0.70	18.2	B	-	-	-	-	
	Overall Intersection		**0.87**	**25.5**	**C**	**-**	**0.89**	**26.7**	**C**	**-**	**-**	**-**	**-**	
7. BROADWAY & 21ST STREET														
Broadway	EB	LTR	1.13	~~107.6~~ 106.0	F	LTR	1.16	~~120.4~~ 118.8	F*	LTR	~~1.12~~ 1.11	~~102.5~~ 99.5	F	-Modify signal timing: shift 1 s green time from NB/SB phase to EB/WB phase [EB/WB green time shifts from 31 s to 32 s; NB/SB green time shifts from 69 s to 68 s].
	WB	LTR	~~1.17~~ 1.15	~~125.7~~ 115.7	F	LTR	~~1.19~~ 1.17	~~134.4~~ 124.3	F*	LTR	~~1.13~~ 1.11	~~108.0~~ 98.7	F	
21st Street	NB	LTR	~~0.91~~ 0.90	~~26.7~~ 26.4	C	LTR	~~0.93~~ 0.92	~~28.2~~ 27.8	C	LTR	~~0.94~~ 0.94	~~30.1~~ 29.6	C	
	SB	LTR	~~0.72~~ 0.70	~~20.6~~ 20.1	C	LTR	~~0.73~~ 0.71	~~20.9~~ 20.5	C	LTR	~~0.74~~ 0.72	~~21.9~~ 21.4	C	
	Overall Intersection		**~~0.99~~ 0.98**	**~~42.8~~ 41.4**	**D**	**-**	**~~1.01~~ 1.00**	**~~45.8~~ 44.4**	**D**	**-**	**~~1.00~~ 0.99**	**~~42.6~~ 41.0**	**D**	
8. 36TH AVENUE & 31ST STREET														
36th Avenue	EB	LTR	0.80	32.0	C	LTR	0.85	34.9	C	-	-	-	-	-Mitigation not required.
	WB	LTR	0.71	31.6	C	LTR	0.73	~~32.2~~ 32.3	C	-	-	-	-	
31st Street	NB	LTR	0.69	19.0	B	LTR	~~0.70~~ 0.69	~~19.2~~ 19.0	B	-	-	-	-	
	SB	LTR	0.48	14.5	B	LTR	0.48	14.5	B	-	-	-	-	
	Overall Intersection		**0.73**	**23.2**	**C**	**-**	**~~0.76~~ 0.75**	**24.2**	**C**	**-**	**-**	**-**	**-**	
9. **41ST AVENUE & VERNON BOULEVARD**														
41st Avenue	WB	LR	0.26	16.1	B	LR	0.32	16.9	B	LR	0.35	18.7	B	-Modify signal timing: shift ~~1.8~~ 2 s green time from WB phase to NB/SB phase [NB/SB green time shifts from ~~31.8~~ 32 s to ~~33.6~~ 34 s; WB green time shifts from ~~19.8~~ 20 s to 18 s
Vernon Boulevard	NB	TR	1.03	39.7	D	TR	1.05	47.7	D*	TR	1.00	29.9	C	
	SB	LT	0.93	24.7	C	LT	0.99	35.4	D	LT	0.88	18.5	B	
	Overall Intersection		**0.73**	**31.8**	**C**	**-**	**0.77**	**40.1**	**D**	**-**	**0.77**	**24.3**	**C**	
10. **30TH AVENUE & 21ST STREET**														
30th Avenue	EB	LTR	0.32	34.1	C	LTR	0.33	34.2	C	-	-	-	-	-Mitigation not required.
	WB	LTR	0.48	38.0	D	LTR	0.48	38.0	D	-	-	-	-	
21st Street	NB	LTR	~~0.81~~ 0.76	~~20.6~~ 18.7	~~C~~ B	LTR	~~0.83~~ 0.78	~~21.4~~ 19.3	~~C~~ B	-	-	-	-	
	SB	LTR	~~0.63~~ 0.59	~~16.5~~ 15.6	B	LTR	~~0.65~~ 0.60	~~16.8~~ 15.8	B	-	-	-	-	
	Overall Intersection		**~~0.70~~ 0.66**	**~~20.8~~ 19.5**	**~~C~~ B**	**-**	**~~0.71~~ 0.68**	**~~21.2~~ 19.8**	**~~C~~ B**	**-**	**-**	**-**	**-**	

Table 22-2b (cont'd)
2018 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
PM Peak Hour (continued)														
11. **BROADWAY & VERNON BOULEVARD / 11TH STREET**														
Park Entrance	EB	LTR	0.03	~~33.2~~ 33.5	C	LTR	0.03	~~33.2~~ 33.5	C	-	-	-	-	-Mitigation not required.
Broadway	WB	LTR	~~0.84~~ 0.73	~~52.6~~ 53.9	D	LTR	~~0.86~~ 0.78	~~54.2~~ 58.3	~~D~~ E	-	-	-	-	
Vernon Boulevard	NB	LT	0.46	~~9.3~~ 2.2	A	LT	0.47	~~9.4~~ 2.3	A	-	-	-	-	
		R	0.13	~~6.3~~ 2.5	A	R	0.14	~~6.4~~ 2.6	A	-	-	-	-	
	SB	LTR	~~0.62~~ 0.69	~~29.3~~ 34.4	C	LTR	~~0.63~~ 0.70	~~29.6~~ 35.0	C	-	-	-	-	
11th Street	NB	LTR	0.33	~~38.3~~ 39.5	D	LTR	0.33	~~38.3~~ 39.5	D	-	-	-	-	
	Overall Intersection		**~~0.86~~ -**	**~~24.6~~ 22.6**	**C**	**-**	**~~0.87~~ -**	**~~24.9~~ 23.6**	**C**	**-**	**-**	**-**	**-**	
12. ASTORIA BOULEVARD / 27TH AVENUE / NEWTOWN AVENUE & 21ST STREET														
Astoria Boulevard	EB	L	0.47	42.4	D	L	0.47	42.4	D	L	~~0.41~~ 0.49	~~28.0~~ 43.6	~~C~~ D	-Modify signal timing: shift 1 s green time from the EB phase to the NB/SB phase [EB phase green time shifts from 28 s to 27 s; NB/SB green time shifts from 53 s to 54 s; WB green time remains the same]. -Modify signal phasing: Add a new lag phase for the EB/WB exclusive left turns. The existing signal phasing [WB has 24 s green time; EB has 28 s green time; NB/SB has 53 s green time] would be modified to have the following: EB/WB will have 39 s green time; EB/WB exclusive left-turn phase will have 10 s green time; NB/SB will have 56 s green time [each phase will have 3 s amber and 2 s all red].
		TR	~~0.78~~ 0.76	~~48.9~~ 48.0	D	TR	~~0.80~~ 0.78	~~49.6~~ 48.6	D	TR	~~0.57~~ 0.81	~~35.1~~ 50.7	D	
	WB	L	~~0.89~~ 0.88	~~64.8~~ 63.5	E	L	~~0.89~~ 0.88	~~64.8~~ 63.5	E	L	~~0.76~~ 0.88	~~43.9~~ 63.5	~~D~~ E	
		TR	~~0.78~~ 0.76	~~51.5~~ 51.0	D	TR	~~0.78~~ 0.77	~~51.7~~ 51.2	D	TR	~~0.45~~ 0.77	~~32.9~~ 51.2	~~C~~ D	
21st Street	NB	LTR	~~1.04~~ 1.02	~~54.2~~ 48.5	D	LTR	~~1.08~~ 1.06	~~69.6~~ 62.9	E*	LTR	~~0.99~~ 1.03	~~38.3~~ 50.6	D	
	SB	LTR	0.90	36.3	D	LTR	0.93	38.1	D	LTR	~~0.88~~ 0.91	~~32.7~~ 36.0	~~C~~ D	
	Overall Intersection		**~~0.94~~ 0.92**	**~~48.0~~ 45.9**	**D**		**~~0.96~~ 0.94**	**~~53.6~~ 51.1**	**D**	**-**	**~~0.93~~ 0.94**	**~~35.5~~ 46.8**	**D**	
13. HOYT AVENUE NORTH & 21ST STREET														
Hoyt Avenue North	EB	L	0.09	41.8	D	L	0.09	41.8	D	-	-	-	-	-Mitigation not required.
		R	0.17	43.1	D	R	0.17	43.1	D	-	-	-	-	
	WB	L	0.61	36.8	D	L	0.63	37.3	D	-	-	-	-	
		TR	0.29	15.7	B	TR	0.29	15.7	B	-	-	-	-	
21st Street	NB	L	0.17	26.1	C	L	0.17	26.1	C	-	-	-	-	
		T	1.09	90.0	F	T	1.09	92.4	F	-	-	-	-	
	SB	TR	0.76	39.0	D	TR	0.76	39.0	D	-	-	-	-	
	Overall Intersection		**0.73**	**52.9**	**D**	**-**	**0.74**	**53.8**	**D**	**-**	**-**	**-**	**-**	
14. HOYT AVENUE SOUTH & 21ST STREET														
Hoyt Avenue South	EB	L	0.17	30.8	C	L	0.17	30.8	C	LTR	0.47	34.5	C	-Mitigation not required. -Restripe EB approach of Hoyt Avenue South from one 11-ft exclusive left-turn lane and one 11-ft shared through-right lane to two 11-ft shared left-through-right lanes for 250 ft. [Measures reflect improvements needed for the weekday AM peak period.]
		TR	0.75	44.3	D	TR	0.75	44.3	D	-	-	-	-	
21st Street	NB	LTR	0.92	26.3	C	LTR	0.94	~~29.5~~ 28.1	C	LTR	0.94	~~29.5~~ 28.1	C	
	SB	LTR	0.89	~~28.0~~ 27.4	C	LTR	0.91	29.3	C	LTR	0.91	29.3	C	
	Overall Intersection		**0.86**	**~~29.4~~ 29.2**	**C**	**-**	**0.87**	**~~31.3~~ 30.7**	**C**	**-**	**0.78**	**~~30.2~~ 29.6**	**C**	

Notes:
(1) Control delay is measured in seconds per vehicle.
(2) Overall intersection V/C ratio is the critical lane groups' V/C ratio.
***** Denotes a significant impact.

Table 22-3a
2038 No Action, With Action, and Mitigated Traffic Levels of Service Comparison
(Unsignalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
AM Peak Hour														
1. EAST/WEST ROAD & MAIN STREET														
West Road	EB	LT	-	7.2	A	LT	-	8.0	A	LT	-	8.2	A	-Mitigation not required. -Conditions shown reflect additional U-turns that would use this intersection because of the proposed elimination of the traffic triangle at West Road and Main Street.
Main Street	SB	LR	-	7.4	A	LR	-	11.3	B	LR	-	13.9	B	
	Overall Intersection		-	**7.3**	**A**	**-**	**-**	**11.2**	**B**	**-**	**-**	**13.9**	**B**	
2. WEST ROAD & MAIN STREET														
West Road	EB	LR	-	9.3	A	LR	-	12.7	B	LR	0.36	15.8	B	-Mitigation not required. -Install traffic signal with the following timing plan: EB will have 22 s green time; NB/SB will have 28 s green time [each phase will have 3 s amber and 2 s all red time]. -Reconfigure to eliminate traffic triangle and consolidate turning movements at one intersection. [Measures reflect improvements needed for the weekday PM peak period.]
West Road (south of island)	EB	LR	-	11.5	B	LR	-	16.4	C	-	-	-	-	
Main Street	NB	LT	-	10.1	B	LT	-	12.1	B	T	0.28	10.7	B	
	SB	TR	-	9.6	A	TR	-	25.2	D	T	0.69	17.3	B	
	Overall Intersection		-	**10.1**	**B**	**-**	**-**	**19.4**	**C**	**-**	**0.55**	**15.6**	**B**	
3. ROOSEVELT ISLAND BRIDGE RAMP & MAIN STREET														
Roosevelt Island Bridge Ramp	WB	LR	-	16.2	C	LR	-	110.6	F*	LR	0.91	30.9	C	-Install traffic signal with the following timing plan: WB will have 28 s green time; NB/SB will have 22 s green time [each phase will have 3 s amber and 2 s all red time].
Main Street	NB	T	-	10.4	B	T	-	11.6	B	T	0.12	13.1	B	
		R	-	11.4	B	R	-	17.9	C	R	0.69	24.1	C	
	SB	LT	-	12.8	B	LT	-	15.9	C	LT	0.47	17.8	B	
	Overall Intersection		-	**13.9**	**B**	**-**	**-**	**67.9**	**F**	**-**	**0.81**	**26.4**	**C**	
4. ROOSEVELT ISLAND BRIDGE & MOTORGATE GARAGE ENTRANCE / EXIT														
Roosevelt Island Bridge	EB	LT	-	8.5	A	LT	-	9.6	A	-	-	-	-	-Mitigation not required.
Motorgate Garage Exit	NB	LR	-	11.5	B	LR	-	13.0	B	-	-	-	-	
	Overall Intersection		-	**1.5**	**A**	**-**	**-**	**1.4**	**A**	-	-	-	-	
Midday Peak Hour														
1. EAST/WEST ROAD & MAIN STREET														
West Road	EB	LT	-	7.6	A	LT	-	8.1	A	LT	-	8.2	A	-Mitigation not required. -Conditions shown reflect additional U-turns that would use this intersection because of the proposed elimination of the traffic triangle at West Road and Main Street.
Main Street	SB	LR	-	7.4	A	LR	-	9.1	A	LR	-	9.7	A	
	Overall Intersection		-	**7.5**	**A**	**-**	**-**	**9.0**	**A**	**-**	**-**	**9.5**	**A**	

Table 22-3a (cont'd)
2038 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Unsignalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
Midday Peak Hour (continued)														
2. WEST ROAD & MAIN STREET														
West Road	EB	LR	-	8.5	A	LR	-	12.6	B	LR	0.48	17.7	B	-Mitigation not required. -Install traffic signal with the following timing plan: EB will have 22 s green time; NB/SB will have 28 s green time [each phase will have 3 s amber and 2 s all red time]. -Reconfigure to eliminate traffic triangle and consolidate turning movements at one intersection. [Measures reflect improvements needed for the weekday PM peak period.]
West Road (south of island)	EB	LR	-	10.9	B	LR	-	13.4	B	-	-	-	-	
Main Street	NB	LT	-	9.4	A	LT	-	11.4	B	T	0.22	10.1	B	
	SB	TR	-	8.7	A	TR	-	14.5	B	T	0.47	12.8	B	
	Overall Intersection		-	**9.4**	**A**	**-**	**-**	**13.1**	**B**	**-**	**0.47**	**13.7**	**B**	
3. ROOSEVELT ISLAND BRIDGE RAMP & MAIN STREET														
Roosevelt Island Bridge Ramp	WB	LR	-	10.4	B	LR	-	21.5	C	LR	0.54	14.1	B	-Mitigation not required. -Install traffic signal with the following timing plan: WB will have 28 s green time; NB/SB will have 22 s green time [each phase will have 3 s amber and 2 s all red time]. [Measures reflect improvements needed for the weekday AM and PM peak periods.]
Main Street	NB	T	-	9.3	A	T	-	10.5	B	T	0.14	13.2	B	
		R	-	9.2	A	R	-	16.9	C	R	0.82	32.6	C	
	SB	LT	-	10.8	B	LT	-	13.4	B	LT	0.47	18.2	B	
	Overall Intersection		-	**10.0**	**B**	**-**	**-**	**17.6**	**C**	**-**	**0.67**	**21.2**	**C**	
4. ROOSEVELT ISLAND BRIDGE & MOTORGATE GARAGE ENTRANCE / EXIT														
Roosevelt Island Bridge	EB	LT	-	7.7	A	LT	-	8.2	A	-	-	-	-	-Mitigation not required.
Motorgate Garage Exit	NB	LR	-	10.1	B	LR	-	11.4	B	-	-	-	-	
	Overall Intersection		-	**0.9**	**A**	**-**	**-**	**0.7**	**A**	-	-	-	-	
PM Peak Hour														
1. EAST/WEST ROAD & MAIN STREET														
West Road	EB	LT	-	7.4	A	LT	-	7.8	A	LT	-	7.9	A	-Mitigation not required. -Conditions shown reflect additional U-turns that would use this intersection because of the proposed elimination of the traffic triangle at West Road and Main Street.
Main Street	SB	LR	-	7.3	A	LR	-	8.5	A	LR	-	9.0	A	
	Overall Intersection		-	**7.3**	**A**	**-**	**-**	**8.4**	**A**	**-**	**-**	**8.8**	**A**	
2. WEST ROAD & MAIN STREET														
West Road	EB	LR	-	9.0	A	LR	-	84.8	F*	LR	0.96	42.4	D	-Install traffic signal with the following timing plan: EB will have 25 s green time; NB/SB will have 25 s green time [each phase will have 3 s amber and 2 s all red time]. -Reconfigure to eliminate traffic triangle and consolidate turning movements at one intersection.
West Road (south of island)	EB	LR	-	10.9	B	LR	-	12.2	B	-	-	-	-	
Main Street	NB	LT	-	10.4	B	LT	-	17.3	C	T	0.22	11.9	B	
	SB	TR	-	9.0	A	TR	-	16.8	C	T	0.36	13.4	B	
	Overall Intersection		-	**9.9**	**A**	**-**	**-**	**48.6**	**E**	**-**	**0.66**	**30.6**	**C**	

Table 22-3a (cont'd)
2038 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Unsignalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
PM Peak Hour (continued)														
3. ROOSEVELT ISLAND BRIDGE RAMP & MAIN STREET														
Roosevelt Island Bridge Ramp	WB	LR	-	11.5	B	LR	-	20.2	C	LR	0.58	19.1	B	-Install traffic signal with the following timing plan: WB will have 22 s green time; NB/SB will have 28 s green time [each phase will have 3 s amber and 2 s all red time].
Main Street	NB	T	-	9.7	A	T	-	10.7	B	T	0.08	9.1	A	
		R	-	10.0	A	R	-	37.6	E*	R	0.86	28.6	C	
	SB	LT	-	15.4	C	LT	-	23.5	C	LT	0.63	16.9	B	
	Overall Intersection		-	**12.7**	**B**	**-**	**-**	**28.0**	**D**	**-**	**0.74**	**22.0**	**C**	
4. ROOSEVELT ISLAND BRIDGE & MOTORGATE GARAGE ENTRANCE / EXIT														
Roosevelt Island Bridge	EB	LT	-	7.9	A	LT	-	8.3	A					-Mitigation not required.
Motorgate Garage Exit	NB	LR	-	13.0	B	LR	-	20.0	C					
	Overall Intersection		-	**1.0**	**A**	**-**	**-**	**1.1**	**A**					

Notes:
(1) Control delay is measured in seconds per vehicle.
(2) Overall intersection V/C ratio is the critical lane groups' V/C ratio.
* Denotes a significant impact.

Table 22-3b
2038 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
AM Peak Hour														
5. ROOSEVELT ISLAND BRIDGE / 36TH AVENUE & VERNON BOULEVARD														
Roosevelt Island Bridge	EB	L	0.31	13.3	B	L	0.46	16.3	B	L	0.55	27.5	C	-Partially Mitigated - Modify the cycle length from 60 s to 90 s. EB/WB green time is 35 s; NB/SB green time is 45 s; each phase has 3 s of amber and 2 s of red time. ~~Unmitigatable Impacts~~
		TR	0.62	17.7	B	TR	0.77	22.5	C	TR	0.83	35.3	D	
36th Avenue	WB	LTR	~~1.20+~~ 0.43	~~214.4~~ 14.5	~~F~~ B	LTR	0.64	18.8	B	LTR	0.78	35.1	D	
Vernon Boulevard	NB	LTR	~~1.20+~~ 1.16	~~336.7~~ 91.6	F	LTR	1.20+	~~556.3~~ 358.8	F*	LTR	1.20+	204.5	F	
	SB	LTR	1.14	87.6	F	LTR	1.20+	~~385.7~~ 133.7	F*	LTR	1.04	52.5	D	
	Overall Intersection		**~~1.16~~ 0.89**	**~~199.1~~ 61.5**	**~~F~~ E**	**-**	**1.20+**	**~~287.0~~ 144.9**	**F**		**1.15**	**84.3**	**F**	

Table 22-3b (cont'd)
2038 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
AM Peak Hour (continued)														
6. 36TH AVENUE & 21ST STREET														
36th Avenue	EB	LTR	0.91	59.0	E	LTR	1.20+	169.1	F*	L	0.83	72.8	E	-Shift centerline 6 ft to the north and restripe EB approach from one 25-ft travel lane to 11-ft exclusive left-turn lane, one 20-ft shared through-right lane with parking for 200 ft. -Shift centerline 6 ft to the south and restripe WB approach from one 25-ft travel lane to 11-ft exclusive left-turn lane, one 20-ft shared through-right lane with parking for 125 ft. -Modify signal timing: shift 4 s green time from EB/WB phase to NB/SB phase [EB/WB] green time shifts from 37 s to 33 s; NB/SB green time shifts from 73 s to 77 s].
		-	-	-	-	-	-	-	-	TR	0.85	54.3	D	
	WB	LTR	1.02	68.4	E	LTR	1.17	123.1	F*	L	0.47	38.4	D	
		-	-	-	-	-	-	-	-	TR	1.03	72.6	E	
21st Street	NB	LTR	0.40	13.0	B	LTR	0.41	13.2	B	LTR	0.38	10.8	B	
	SB	LTR	1.14	88.8	F	LTR	1.20	115.1	F*	LTR	1.14	85.0	F	
	Overall Intersection		**1.10**	**69.5**	**E**	**-**	**1.20+**	**104.5**	**F**	**-**	**1.10**	**66.9**	**E**	
7. BROADWAY & 21ST STREET														
Broadway	EB	LTR	1.20+	~~331.7~~ 202.5	~~1.62~~ F	LTR	1.20+	~~356.0~~ 222.4	F*	L	0.39	42.2	D	-Prohibit parking along the EB approach for 200 ft from the intersection and the EB receiving side for 250 ft from the intersection. -Shift centerline 3 ft to the north and restripe EB approach from one 22-ft travel lane with parking to one 10-ft exclusive left-turn lane and one 15-ft travel lane for 200 ft. -Shift centerline 7 ft to the south and restripe WB approach from one 22-ft travel lane with parking to one 10-ft exclusive left-turn lane and one 19-ft travel lane with parking for 250 ft. -Modify signal timing: shift 2 s green time to the all red time for the EB/WB phase and shift 3 s green time from the LPI phase to the NB/SB phase [EB/WB green time shifts from 31 s to 29 s; NB/SB green time shifts from 69 s to 72 s; LPI phase shifts from 10 s to 7 s]. ~~Unmitigatable Impacts~~
		-	-	-	-	-	-	-	-	TR	0.88	59.3	E	
	WB	LTR	~~1.20+~~ 1.14	~~171.3~~ 124.1	F	LTR	1.20+	~~215.4~~ 165.4	F*	L	0.82	66.9	E	
		-	-	-	-	-	-	-	-	TR	0.67	44.8	D	
21st Street	NB	LTR	~~0.55~~ 0.51	~~17.1~~ 16.4	B	LTR	~~0.59~~ 0.52	~~18.1~~ 16.6	B	LTR	0.50	14.7	B	
	SB	LTR	~~1.16~~ 1.11	~~97.9~~ 77.6	~~F~~ E	LTR	~~1.20+~~ 1.16	~~130.4~~ 97.1	F*	LTR	1.11	74.1	E	
	Overall Intersection		**~~1.20+~~ 1.18**	**~~115.7~~ 82.1**	**F**	**-**	**1.20+**	**~~140.7~~ 98.9**	**F**	**-**	**1.04**	**55.9**	**E**	
8. 36TH AVENUE & 31ST STREET														
36th Avenue	EB	LTR	0.79	38.1	D	LTR	0.84	42.0	D					-Mitigation not required.
	WB	LTR	0.74	32.6	C	LTR	0.80	35.8	D					
31st Street	NB	LTR	0.73	20.8	C	LTR	0.82	25.8	C					
	SB	LTR	0.73	20.2	C	LTR	0.74	20.6	C					
	Overall Intersection		**0.76**	**25.7**	**C**	**-**	**0.83**	**28.7**	**C**					

Table 22-3b (cont'd)
2038 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
AM Peak Hour (continued)														
9. **41ST AVENUE & VERNON BOULEVARD**														
41st Avenue	WB	LR	0.31	16.7	B	LR	0.34	17.1	B	LR	0.39	19.8	B	-Modify signal timing: shift ~~2.4~~ 2 s green time from WB phase to NB/SB phase [NB/SB green time shifts from ~~31.8~~ 32 s to ~~34.2~~ 34 s; WB green time shifts from ~~19.8~~ 20 s to ~~17.4~~ 18 s].
Vernon Boulevard	NB	TR	0.72	15.0	B	TR	0.83	19.4	B	TR	0.77	14.9	B	
	SB	LT	1.20+	110.2	F	LT	1.20+	157.1	F*	LT	1.18	96.7	F	
	Overall Intersection		**0.86**	**68.4**	**E**	**-**	**0.94**	**93.0**	**F**	**-**	**0.91**	**59.2**	**E**	
10. **30TH AVENUE & 21ST STREET**														
30th Avenue	EB	LTR	0.82	56.4	E	LTR	0.82	56.4	E					-No mitigation required. ~~Unmitigatable Impact~~
	WB	LTR	0.94	72.2	E	LTR	0.95	75.2	E					
21st Street	NB	LTR	~~0.59~~ 0.52	~~16.1~~ 14.6	B	LTR	~~0.61~~ 0.53	~~16.5~~ 14.8	B					
	SB	LTR	~~1.09~~ 1.00	~~64.9~~ 31.3	~~E~~ C	LTR	~~1.13~~ 1.04	~~82.5~~ 43.7	~~F*~~ D					
	Overall Intersection		**~~1.04~~ 0.98**	**~~51.6~~ 32.8**	**~~D~~ C**	**-**	**~~1.07~~ 1.01**	**~~62.0~~ 39.9**	**~~E~~ D**					
11. **BROADWAY & VERNON BOULEVARD / 11TH STREET**														
Park Entrance	EB	LTR	0.01	~~28.2~~ 28.0	C	LTR	0.01	~~28.2~~ 28.0	C					-Unmitigatable Impacts
Broadway	WB	LTR	~~1.24~~ 1.02	~~146.1~~ 97.7	F	LTR	~~1.30~~ 1.08	~~175.4~~ 111.8	F*					
		-	-	-	-	-	-	-	-					
Vernon Boulevard	NB	LT	0.30	~~8.4~~ 2.1	A	LT	0.31	~~8.5~~ 2.1	A					
		R	0.10	~~6.8~~ 1.2	A	R	0.11	~~6.8~~ 1.2	A					
	SB	LTR	~~1.56~~ 1.20+	~~284.7~~ 207.0	F	LTR	~~1.63~~ 1.20+	~~318.0~~ 247.9	F*					
11th Street	NB	LTR	0.43	~~42.6~~ 43.7	D	LTR	0.43	~~42.6~~ 43.7	D					
	Overall Intersection		**~~1.20+~~ -**	**~~177.5~~ 120.6**	**F**	**-**	**~~1.20+~~ -**	**~~200.9~~ 143.0**	**F**					

Table 22-3b (cont'd)
2038 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
AM Peak Hour (continued)														
12. ASTORIA BOULEVARD / 27TH AVENUE / NEWTOWN AVENUE & 21ST STREET														
Astoria Boulevard	EB	L	~~1.06~~ 0.98	~~106.3~~ 83.6	F	L	~~1.06~~ 0.98	~~106.3~~ 83.6	F	L	~~0.86~~ 0.95	~~54.7~~ 74.5	~~D~~ E	-Prohibit parking along the SB approach for 100 ft from the intersection for the weekday AM and PM peak periods and along the NB approach for 100 ft from the intersection for the weekday PM peak period. -Shift centerline 2 ft to the east and restripe SB approach from one 11-ft shared left-through lane and one 19-ft shared through-right lane with parking to one 11-ft shared left-through lane, one 10-ft travel lane, and one 11-ft parking which would serve as a right turn lane during the weekday AM and PM peak periods. -Modify signal timing: shift 1 s green time from the NB/SB phase to the EB phase [EB phase green time shifts from 25 s to 26 s; NB/SB green time shifts from 50 s to 49 s; WB green time remains the same]. ~~-Modify signal phasing: Add a new lag phase for the EB/WB. The existing signal phasing [WB has 30 s green time; EB has 25 s green time; NB/SB has 50 s green time] would be modified to have the following: EB/WB will have 31 s green time; EB/WB exclusive left-turn phase will have 21 s green time; NB/SB will have 53 s green time [each phase will have 3 s amber and 2 s all red].~~
		TR	1.20+	~~471.4~~ 443.9	F	TR	1.20+	~~480.3~~ 452.8	~~F*~~	TR	1.20+	~~305.9~~ 419.8	F	
	WB	L	1.05	81.9	F	L	1.05	81.9	F	L	~~1.04~~ 1.05	~~67.4~~ 81.9	~~E~~ F	
		TR	~~0.98~~ 0.95	~~57.7~~ 53.7	~~E~~ D	TR	~~0.99~~ 0.97	~~60.7~~ 56.0	E	TR	~~0.96~~ 0.97	~~53.7~~ 56.0	~~D~~ E	
21st Street	NB	LTR	1.20+	~~212.7~~ 178.5	F	LTR	1.20+	~~234.1~~ 198.7	~~F*~~	LTR	1.20+	~~188.6~~ 150.9	F	
	SB	LTR	1.20+	~~173.3~~ 172.0	F	LTR	1.20+	~~200.5~~ 199.2	~~F*~~	~~LTR~~ LT	~~1.20+~~ 0.97	~~164.6~~ 36.8	~~F~~ D	
			-	-	-	-	-	-	-	**R**	**0.66**	**28.1**	**C**	
	Overall Intersection		**1.20+**	**~~217.4~~ 203.2**	**F**	-	**1.20+**	**~~232.1~~ 217.8**	**F**	-	**1.20+**	**~~169.6~~ 144.2**	**F**	
13. HOYT AVENUE NORTH & 21ST STREET														
Hoyt Avenue North	EB	L	0.02	40.4	D	L	0.02	40.4	D					-Unmitigatable Impacts
		R	0.39	48.2	D	R	0.39	48.2	D					
	WB	L	1.10	91.1	F	L	1.16	116.3	~~F*~~					
		TR	0.26	15.0	B	TR	0.26	15.0	B					
21st Street	NB	L	0.36	35.0	~~C~~ D	L	0.37	36.2	D					
		T	1.20+	188.8	F	T	1.20+	191.5	F*					
	SB	TR	1.13	~~585.7~~ 99.5	F	TR	1.16	~~600.0+~~ 112.2	~~F*~~					
	Overall Intersection		**1.04**	**~~218.6~~ 108.3**	**F**	-	**1.06**	**~~259.5~~ 122.3**	**F**					
14. HOYT AVENUE SOUTH & 21ST STREET														
Hoyt Avenue South	EB	L	0.36	32.5	C	L	0.36	32.5	C	LTR	0.95	45.3	D	-Restripe EB approach of Hoyt Avenue South from one 11-ft exclusive left-turn lane and one 11-ft shared through-right lane to two 11-ft shared left-through-right lanes. -Modify signal timing: shift 3 s green time from EB phase to NB/SB phase [EB green time shifts from 37 s to 34 s; NB/SB green time shifts from 73 s to 76 s].
		TR	1.20+	219.6	F	TR	1.20+	219.6	F	-	-	-	-	
21st Street	NB	LTR	0.80	~~45.0~~ 23.0	~~D~~ C	LTR	0.83	~~54.1~~ 25.1	~~D*~~ C	LTR	0.78	~~40.0~~ 20.3	~~D~~ C	
	SB	LTR	1.20+	147.4	F	LTR	1.20+	170.0	~~F*~~	LTR	1.20+	138.1	F	
	Overall Intersection		**1.20+**	**~~129.3~~ 123.7**	**F**	-	**1.20+**	**~~143.6~~ 136.3**	**F**	-	**1.16**	**~~92.7~~ 87.8**	**F**	

Table 22-3b (cont'd)
2038 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
Midday Peak Hour														
5. ROOSEVELT ISLAND BRIDGE / 36TH AVENUE & VERNON BOULEVARD														
Roosevelt Island Bridge	EB	L	0.24	12.5	B	L	0.37	14.7	B	L	0.48	26.9	C	-Modify the cycle length from 60 s to 90 s. EB/WB green time is 33 s; NB/SB green time is 47 s; each phase has 3 s of amber and 2 s of red time. ~~Unmitigatable Impact~~
		TR	0.44	14.6	B	TR	0.68	20.0	B	TR	0.77	35.2	D	
36th Avenue	WB	LTR	0.37	14.0	B	LTR	0.59	18.2	B	LTR	0.81	42.3	D	
Vernon Boulevard	NB	LTR	~~1.04~~ 0.91	~~54.5~~ 27.5	~~D~~ C	LTR	1.20+	~~219.6~~ 140.4	F*	LTR	0.96	38.0	D	
	SB	LTR	0.85	27.4	C	LTR	0.93	36.0	D	LTR	0.75	22.3	C	
	Overall Intersection		**~~0.74~~ 0.67**	**~~31.4~~ 22.6**	**C**	**-**	**~~1.06~~ 0.97**	**~~82.1~~ 58.9**	**~~F~~ E**	-	**0.90**	**33.1**	**C**	
6. 36TH AVENUE & 21ST STREET														
36th Avenue	EB	LTR	0.89	56.6	E	LTR	1.20+	193.8	F*	L	0.72	51.2	D	-Shift centerline 6 ft to the north and restripe EB approach from one 25-ft travel lane to 11-ft exclusive left-turn lane, one 20-ft shared through-right lane with parking for 200 ft. -Shift centerline 6 ft to the south and restripe WB approach from one 25-ft travel lane to 11-ft exclusive left-turn lane, one 20-ft shared through-right lane with parking for 125 ft. '-Modify signal timing: shift 2 s green time from EB/WB phase to NB/SB phase [EB/WB] green time shifts from 37 s to 35 s; NB/SB green time shifts from 73 s to 75 s].
		-	-	-	-	-	-	-	-	TR	0.68	42.8	D	
	WB	LTR	0.96	63.8	E	LTR	1.02	78.2	E*	L	0.38	36.8	D	
		-	-	-	-	-	-	-	-	TR	0.84	50.8	D	
21st Street	NB	LTR	0.75	19.4	B	LTR	1.02	52.1	D*	LTR	0.99	41.3	D	
	SB	LTR	0.69	18.1	B	LTR	0.73	19.3	B	LTR	0.71	17.5	B	
	Overall Intersection		**0.82**	**28.5**	**C**	**-**	**1.12**	**61.7**	**E**	**-**	**0.94**	**34.4**	**C**	

Table 22-3b (cont'd)
2038 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
Midday Peak Hour (continued)														
7. BROADWAY & 21ST STREET														
Broadway	EB	LTR	~~1.20+~~ 1.04	~~191.5~~ 86.9	F	LTR	~~1.20+~~ 1.08	~~227.0~~ 99.6	F*	L	0.19	37.8	D	-Prohibit parking along the EB approach for 200 ft from the intersection and the EB receiving side for 250 ft from the intersection. -Shift centerline 3 ft to the north and restripe EB approach from one 22-ft travel lane with parking to one 10-ft exclusive left-turn lane and one 15-ft travel lane for 200 ft. -Shift centerline 7 ft to the south and restripe WB approach from one 22-ft travel lane with parking to one 10-ft exclusive left-turn lane and one 19-ft travel lane with parking for 250 ft. -Modify signal timing: shift 2 s green time to the all red time for the EB/WB phase and shift 3 s green time from the LPI phase to the NB/SB phase [EB/WB green time shifts from 31 s to 29 s; NB/SB green time shifts from 69 s to 72 s; LPI phase shifts from 10 s to 7 s]. ~~Unmitigatable Impacts~~
		-	-	-	-	-	-	-	-	TR	0.88	54.9	D	
	WB	LTR	1.20+	~~161.7~~ 156.5	F	LTR	~~1.28~~ 1.20+	~~179.6~~ 176.1	F*	L	0.77	65.9	E	
		-	-	-	-	-	-	-	-	TR	0.84	51.9	D	
21st Street	NB	LTR	~~0.90~~ 0.85	~~28.3~~ 24.7	C	LTR	~~0.93~~ 0.87	~~30.9~~ 26.0	C	LTR	0.83	22.4	C	
	SB	LTR	~~0.87~~ 0.08	~~27.4~~ 23.1	C	LTR	~~0.94~~ 0.83	~~34.3~~ 24.8	C	LTR	0.80	21.5	C	
	Overall Intersection		**~~1.03~~ 0.96**	**~~63.3~~ 46.1**	**~~E~~ D**	**-**	**~~1.08~~ 0.99**	**~~73.0~~ 50.8**	**~~E~~ D**	-	**0.84**	**29.3**	**C**	
8. 36TH AVENUE & 31ST STREET														
36th Avenue	EB	LTR	0.88	42.3	D	LTR	0.93	48.3	D*	LTR	0.82	34.4	C	-Modify signal timing: shift 3 s green time from NB/SB phase to EB/WB phase [EB/WB green time shifts from 31 s to 34 s; NB/SB green time shifts from 49 s to 46 s].
	WB	LTR	0.80	36.2	D	LTR	0.83	38.5	D	LTR	0.76	31.6	C	
31st Street	NB	LTR	0.63	17.9	B	LTR	0.64	18.2	B	LTR	0.69	21.5	C	
	SB	LTR	0.53	15.3	B	LTR	0.53	15.4	B	LTR	0.56	17.9	B	
	Overall Intersection		**0.73**	**26.5**	**C**	**-**	**0.76**	**28.6**	**C**	**-**	**0.75**	**25.6**	**C**	
9. **41ST AVENUE & VERNON BOULEVARD**														
41st Avenue	WB	LR	0.21	15.5	B	LR	0.21	15.5	B	LR	0.23	17.7	B	-Mitigation not required. -Modify signal timing: shift ~~2.4~~ 2 s green time from WB phase to NB/SB phase [NB/SB green time shifts from ~~31.8~~ 32 s to ~~34.2~~ 34 s; WB green time shifts from ~~19.8~~ 20 s to ~~17.4~~ 18 s]. [Measures reflect improvements needed for the weekday AM and PM peak periods.]
Vernon Boulevard	NB	TR	0.74	15.7	B	TR	0.80	17.8	B	TR	0.74	14.0	B	
	SB	LT	0.73	15.3	B	LT	0.80	18.1	B	LT	0.74	14.2	B	
	Overall Intersection		**0.53**	**15.5**	**B**	**-**	**0.57**	**17.8**	**B**	**-**	**0.57**	**14.3**	**B**	
10. **30TH AVENUE & 21ST STREET**														
30th Avenue	EB	LTR	0.50	38.7	D	LTR	0.50	38.7	D	-	-	-	-	-Mitigation not required.
	WB	LTR	0.65	45.0	D	LTR	0.66	45.2	D	-	-	-	-	
21st Street	NB	LTR	0.84	23.4	C	LTR	0.88	25.7	C	-	-	-	-	
	SB	LTR	0.86	23.8	C	LTR	0.89	25.9	C	-	-	-	-	
	Overall Intersection		**0.79**	**26.3**	**C**	**-**	**0.81**	**28.1**	**C**	-	-	-	-	

Table 22-3b (cont'd)
2038 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
Midday Peak Hour (continued)														
11. **BROADWAY & VERNON BOULEVARD / 11TH STREET**														
Park Entrance	EB	LTR	0.02	~~26.2~~ 27.0	C	LTR	0.02	~~26.2~~ 27.0	C					-Unmitigatable Impact
Broadway	WB	LTR	~~1.09~~ 1.03	~~93.0~~ 100.7	F	LTR	~~1.13~~ 1.07	~~106.3~~ 119.4	F*					
		-	-	-	-	-	-	-	-					
Vernon Boulevard	NB	LT	0.31	~~8.8~~ 3.3	A	LT	0.32	~~8.9~~ 3.6	A					
		R	0.20	~~7.8~~ 3.4	A	R	0.21	~~7.9~~ 3.6	A					
	SB	LTR	~~0.75~~ 0.85	~~34.5~~ 46.4	~~C~~ D	LTR	~~0.78~~ 0.88	~~36.2~~ 50.3	D					
11th Street	NB	LTR	0.26	~~33.6~~ 35.2	~~C~~ D	LTR	0.26	~~33.6~~ 35.6	~~C~~ D					
	Overall Intersection		~~**0.90**~~ -	~~**41.0**~~ **43.6**	**D**	**-**	~~**0.93**~~ -	~~**45.1**~~ **49.7**	**D**					
12. ASTORIA BOULEVARD / 27TH AVENUE / NEWTOWN AVENUE & 21ST STREET														
Astoria Boulevard	EB	L	0.36	36.8	D	L	0.36	36.8	D	L	~~0.33~~ 0.38	~~25.3~~ 38.8	~~C~~ D	-Shift centerline 2 ft to the east and restripe SB approach from one 11-ft shared left-through lane and one 19-ft shared through-right lane with parking to one 11-ft shared left-through lane, one 10-ft travel lane, and one 11-ft parking which would serve as a right turn lane during the weekday AM and PM peak periods.
		TR	0.70	44.2	D	TR	~~0.73~~ 0.72	~~45.0~~ 44.3	D	TR	~~0.78~~ 0.76	~~48.8~~ 47.9	D	
	WB	L	0.92	59.6	E	L	0.92	59.6	E	L	~~0.91~~ 0.92	~~54.8~~ 59.6	~~D~~ E	
		TR	~~0.71~~ 0.55	~~44.2~~ 38.2	D	TR	0.57	~~38.5~~ 38.4	D	TR	~~0.61~~ 0.57	~~40.7~~ 38.4	D	
21st Street	NB	LTR	1.20+	443.0	F	LTR	1.20+	501.8	F*	LTR	~~1.18~~ 1.20+	~~116.2~~ 419.0	F	
	SB	LTR	1.20+	220.2	F	LTR	1.20+	242.7	F*	LTR	~~1.03~~ 1.20+	~~56.3~~ 187.2	~~E~~ F	
	Overall Intersection		**1.19**	~~**205.0**~~ **205.7**	**F**	**-**	**1.20+**	~~**229.1**~~ **229.8**	**F**	**-**	~~**1.05**~~ **1.20+**	~~**67.5**~~ **190.5**	~~**E**~~ **F**	-Modify signal timing: shift 2 s green time from the EB phase to the NB/SB phase [EB phase green time shifts from 34 s to 32 s; NB/SB green time shifts from 37 s to 39 s; WB green time remains the same]. ~~-Modify signal phasing: Add a new lag phase for the EB/WB. The existing signal phasing [WB has 34 s green time; EB has 34 s green time; NB/SB has 37 s green time] would be modified to have the following: EB/WB will have 32 s green time; EB/WB exclusive left-turn phase will have 22 s green time; NB/SB will have 51 s green time [each phase will have 3 s amber and 2 s all red].~~

Table 22-3b (cont'd)
2038 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
Midday Peak Hour (continued)														
13. HOYT AVENUE NORTH & 21ST STREET														
Hoyt Avenue North	EB	L	0.12	42.3	D	L	0.12	42.3	D					
		R	0.14	42.7	D	R	0.14	42.7	D					
	WB	L	0.91	49.9	D	L	0.96	55.7	E*					
		TR	0.17	14.3	B	TR	0.17	14.3	B					
21st Street	NB	L	0.13	25.6	C	L	0.13	25.6	C					
		T	0.90	55.3	E	T	0.90	56.2	E					
	SB	TR	0.65	35.8	D	TR	0.66	36.1	D					
	Overall Intersection		**0.74**	**45.7**	**D**	**-**	**0.76**	**48.9**	**D**					-Unmitigatable Impact
14. HOYT AVENUE SOUTH & 21ST STREET														
Hoyt Avenue South	EB	L	0.28	32.7	C	L	0.28	32.7	C	LTR	0.45	34.8	C	[Measures reflect improvements needed for the weekday AM and PM peak periods.] -Restripe EB approach of Hoyt Avenue South from one 11-ft excl. left-turn lane and one 11-ft shared through-right lane to two 11-ft shared left-through-right lanes.
		TR	0.60	40.7	D	TR	0.60	40.7	D	-	-	-	-	
21st Street	NB	LTR	0.52	14.6	B	LTR	0.53	14.8	B	LTR	0.53	14.8	B	
	SB	LTR	0.77	20.2	C	LTR	0.80	21.1	C	LTR	0.80	21.1	C	
	Overall Intersection		**0.71**	**21.4**	**C**	**-**	**0.73**	**21.9**	**C**	**-**	**0.68**	**21.4**	**C**	
PM Peak Hour														
5. ROOSEVELT ISLAND BRIDGE / 36TH AVENUE & VERNON BOULEVARD														
Roosevelt Island Bridge	EB	L	0.49	14.8	B	L	0.64	17.5	B	L	0.63	22.8	C	- Partially Mitigated -Modify the cycle length from 60 s to 90 s. EB/WB green time is 40 s; NB/SB green time is 40 s; each phase has 3 s of amber and 2 s of red time. ~~Unmitigatable Impacts~~
		TR	0.64	16.4	B	TR	1.12	83.2	F*	TR	1.05	64.5	E	
36th Avenue	WB	LTR	0.34	13.5	B	LTR	0.56	18.8	B	LTR	0.51	22.2	C	
Vernon Boulevard	NB	LTR	1.20+	~~236.2~~ 233.8	F	LTR	1.20+	~~443.3~~ 439.4	F*	LTR	1.20+	439.1	F	
	SB	LTR	1.06	63.3	E	LTR	1.10	80.2	F*	LTR	1.04	64.9	E	
	Overall Intersection		~~**1.07**~~ **1.07**	~~**108.6**~~ **107.7**	**F**	**-**	**1.20+**	~~**185.0**~~ **183.8**	**F**	-	**1.20+**	**175.9**	**F**	
6. 36TH AVENUE & 21ST STREET														
36th Avenue	EB	LTR	0.62	37.4	D	LTR	1.20+	250.7	F*	L	0.70	41.9	D	-Shift centerline 6 ft to the north and restripe EB approach from one 25-ft travel lane to 11-ft exclusive left-turn lane, one 20-ft shared through-right lane with parking for 200 ft. -Shift centerline 6 ft to the south and restripe WB approach from one 25-ft travel lane to 11-ft exclusive left-turn lane, one 20-ft shared through-right lane with parking for 125 ft.
		-	-	-	-	-	-	-	-	TR	0.74	40.3	D	
	WB	LTR	0.89	54.2	D	LTR	0.99	70.8	E*	L	0.36	34.9	C	
		-	-	-	-	-	-	-	-	TR	0.75	43.7	D	
21st Street	NB	LTR	1.03	44.7	D	LTR	1.03	44.9	D	LTR	1.03	44.9	D	
	SB	LTR	0.82	22.8	C	LTR	0.85	24.0	C	LTR	0.85	24.0	C	
	Overall Intersection		**0.98**	**38.0**	**D**	**-**	**1.17**	**66.0**	**E**	**-**	**0.93**	**37.6**	**D**	

Table 22-3b (cont'd)
2038 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
PM Peak Hour (continued)														
7. BROADWAY & 21ST STREET														
Broadway	EB	LTR	1.20+	~~293.1~~ 283.2	F	LTR	1.20+	~~339.4~~ 334.0	F*	L	0.60	41.9	D	-Prohibit parking along the EB approach for 200 ft from the intersection and the EB receiving side for 250 ft from the intersection. -Shift centerline 3 ft to the north and restripe EB approach from one 22-ft travel lane with parking to one 10-ft exclusive left-turn lane and one 15-ft travel lane for 200 ft. -Shift centerline 7 ft to the south and restripe WB approach from one 22-ft travel lane with parking to one 10-ft exclusive left-turn lane and one 19-ft travel lane with parking for 250 ft. -Modify signal timing: shift 2 s green time to the all red time for the EB/WB phase and shift 3 s green time from the LPI phase to the NB/SB phase [EB/WB green time shifts from 31 s to 29 s; NB/SB green time shifts from 69 s to 72 s; LPI phase shifts from 10 s to 7 s]. ~~Unmitigatable Impacts~~
		-	-	-	-	-	-	-	-	TR	0.88	46.7	D	
	WB	LTR	1.20+	~~313.1~~ 301.3	F	LTR	1.20+	~~333.3~~ 321.5	F*	L	1.05	89.1	E	
21st Street	NB	-	-	-	-	-	-	-	-	TR	0.75	43.8	D	
		LTR	~~1.05~~ 1.04	~~54.1~~ 51.1	D	LTR	~~1.11~~ 1.09	~~78.3~~ 71.7	E*	LTR	1.04	51.4	D	
	SB	LTR	~~0.84~~ 0.82	~~25.2~~ 24.2	C	LTR	~~0.86~~ 0.84	~~26.6~~ 25.4	C	LTR	0.81	22.0	C	
	Overall Intersection		**~~1.20+~~ 1.20**	**~~99.5~~ 95.8**	**F**	**-**	**1.20+**	**~~118.7~~ 113.7**	**F**	**-**	**1.05**	**41.2**	**D**	
8. 36TH AVENUE & 31ST STREET														
36th Avenue	EB	LTR	0.90	38.7	D	LTR	1.08	~~80.1~~ 81.2	F*	LTR	~~0.95~~ 0.96	~~42.5~~ 43.0	D	-Modify signal timing: shift 3 s green time from NB/SB phase to EB/WB phase [EB/WB green time shifts from 31 s to 34 s; NB/SB green time shifts from 49 s to 46 s].
	WB	LTR	0.80	35.9	D	LTR	0.83	~~37.4~~ 37.9	D	LTR	~~0.75~~ 0.76	~~30.8~~ 31.1	C	
31st Street	NB	LTR	0.83	25.2	C	LTR	~~0.84~~ 0.83	~~25.8~~ 25.2	C	LTR	0.89	~~32.9~~ 31.9	C	
	SB	LTR	0.56	16.1	B	LTR	0.56	16.2	B	LTR	0.60	18.9	B	
	Overall Intersection		**0.86**	**27.7**	**C**	**-**	**0.93**	**~~37.7~~ 37.9**	**D**	**-**	**~~0.92~~ 0.91**	**~~31.1~~ 31.0**	**C**	
9. **41ST AVENUE & VERNON BOULEVARD**														
41st Avenue	WB	LR	0.44	18.9	B	LR	0.52	20.4	C	LR	0.59	24.8	C	-Modify signal timing: shift ~~2.4~~ 2 s green time from WB phase to NB/SB phase [NB/SB green time shifts from ~~31.8~~ 32 s to ~~34.2~~ 34 s; WB green time shifts from ~~19.8~~ 20 s to ~~17.4~~ 18 s].
Vernon Boulevard	NB	TR	1.17	97.4	F	TR	1.20+	114.8	F*	TR	1.13	76.7	E	
	SB	LT	1.14	86.1	F	LT	1.20+	164.2	F*	LT	1.11	70.5	E	
	Overall Intersection		**0.89**	**85.2**	**F**	**-**	**1.01**	**125.4**	**F**	**-**	**0.95**	**68.7**	**E**	
10. **30TH AVENUE & 21ST STREET**														
30th Avenue	EB	LTR	0.52	39.2	D	LTR	0.53	39.5	D	-	-	-	-	-Mitigation not required.
	WB	LTR	0.67	45.3	D	LTR	0.67	45.6	D	-	-	-	-	
21st Street	NB	LTR	~~0.96~~ 0.89	~~31.2~~ 24.2	C	LTR	~~1.01~~ 0.94	~~42.4~~ 28.3	D	-	-	-	-	
	SB	LTR	~~0.70~~ 0.65	~~18.1~~ 16.8	B	LTR	~~0.72~~ 0.67	~~18.6~~ 17.3	B	-	-	-	-	
	Overall Intersection		**~~0.86~~ 0.82**	**~~28.0~~ 24.1**	**C**	**-**	**~~0.90~~ 0.85**	**~~33.9~~ 26.3**	**C**	-	-	-	-	

Table 22-3b (cont'd)
2038 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
PM Peak Hour (continued)														
11. **BROADWAY & VERNON BOULEVARD / 11TH STREET**														
Park Entrance	EB	LTR	0.03	~~33.2~~ 33.5	C	LTR	0.03	~~33.2~~ 33.5	C					-Unmitigatable Impacts
Broadway	WB	LTR	~~1.18~~ 1.09	~~140.0~~ 134.4	F	LTR	~~1.21~~ 1.12	~~150.8~~ 157.1	F*					
		-	-	-	-	-	-	-	-					
Vernon Boulevard	NB	LT	0.57	~~11.0~~ 3.4	~~B~~ A	LT	0.60	~~11.5~~ 4.1	~~B~~ A					
		R	0.16	~~6.6~~ 3.7	A	R	0.19	~~6.7~~ 4.2	A					
	SB	LTR	~~1.15~~ 1.20+	~~117.2~~ 243.5	F	LTR	1.20+	~~138.4~~ 293.9	F*					
11th Street	NB	LTR	0.37	~~39.1~~ 41.9	D	LTR	0.37	~~39.1~~ 41.9	D					
	Overall Intersection		~~**1.17**~~ -	~~**67.5**~~ **95.5**	~~**E**~~ **F**	-	~~**1.20**~~ -	~~**74.5**~~ **114.0**	~~**E**~~ **F**					
12. ASTORIA BOULEVARD / 27TH AVENUE / NEWTOWN AVENUE & 21ST STREET														
Astoria Boulevard	EB	L	0.59	45.2	D	L	0.59	45.2	D	L	0.57	~~40.9~~ 43.9	D	-Prohibit parking along the SB approach for 100 ft from the intersection for the weekday AM and PM peak periods and along the NB approach for 100 ft from the intersection for the weekday PM peak period - Restripe the NB approach from one 11-ft shared left-through lane and one 20-ft shared through-right lane with parking to one 11-ft shared left-through lane, one 10-ft travel lane, and one 10-ft parking lane which would serve as a right turn lane during the weekday PM peak period. -Shift centerline 2 ft to the east and restripe SB approach from one 11-ft shared left-through lane and one 19-ft shared through-right lane with parking to one 11-ft shared left-through lane, one 10-ft travel lane, and one 11-ft parking lane which would serve as a right turn lane during the weekday AM and PM peak periods. -Modify signal timing: shift 1 s green time from the NB/SB phase to the EB phase and 1 s green time from the NB/SB phase to the WB phase [WB green time shifts from 24 s to 25 s; EB phase green time shifts from 28 s to 29 s; NB/SB green time shifts from 53 s to 52 s]. ~~The existing signal phasing [WB has 24 s green time; EB has 28 s green time; NB/SB has 53 s green time] would be modified to have the following: EB/WB will have 33 s green time; EB/WB exclusive left-turn phase will have 15 s green time; NB/SB will have 57 s green time [each phase will have 3 s amber and 2 s all red].~~
		TR	1.20+	~~162.8~~ 152.6	F	TR	~~1.28~~ 1.20+	~~180.2~~ 169.8	F*	TR	~~1.09~~ 1.20+	~~95.3~~ 149.9	F	
	WB	L	~~0.96~~ 0.95	~~75.9~~ 73.1	E	L	~~0.96~~ 0.95	~~75.9~~ 73.1	E	L	~~0.95~~ 0.91	~~72.6~~ 66.1	E	
		TR	~~1.15~~ 1.11	~~127.3~~ 111.1	F	TR	~~1.16~~ 1.12	~~132.3~~ 115.9	F*	TR	~~0.82~~ 1.07	~~45.7~~ 96.3	~~D~~ F	
21st Street	NB	DefL	1.20+	~~526.1~~ 466.5	F	DefL	~~2.08~~ 1.95	~~526.1~~ 466.5	F	LT	1.20+	~~524.1~~ 235.2	F	
		TR	1.20+	434.7	F	TR	~~2.02~~ 1.20+	492.4	F*	R	0.52	25.9	C	
	SB	LTR	1.20+	250.0	F	LTR	~~1.52~~ 1.20+	267.8	F*	LT	~~1.20+~~ 0.85	~~424.6~~ 34.1	~~F~~ C	
			-	-	-	-	-	-	-	R	~~1.20+~~ 1.15	~~214.0~~ 112.3	F	
	Overall Intersection		**1.20+**	~~**254.7**~~ **249.9**	**F**	-	**1.20+**	~~**280.9**~~ **276.3**	**F**	-	**1.20+**	~~**220.6**~~ **118.7**	**F**	

Table 22-3b (cont'd)
2038 No Action, With Action and Mitigated Traffic Levels of Service Comparison
(Signalized Intersections)

Intersection	Approach	No Action				With Action				With Mitigation				Mitigation Measure
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
PM Peak Hour (continued)														
13. HOYT AVENUE NORTH & 21ST STREET														
Hoyt Avenue North	EB	L	0.10	41.9	D	L	0.10	41.9	D					-Unmitigatable Impacts
		R	0.18	43.3	D	R	0.18	43.3	D					
	WB	L	1.07	86.0	F	L	1.10	97.2	F*					
		TR	0.30	15.9	B	TR	0.30	15.9	B					
21st Street	NB	L	0.21	26.9	C	L	0.21	26.9	C					
		T	1.20+	166.0	F	T	1.20+	176.4	F*					
	SB	TR	0.87	~~580.5~~ 45.6	~~F~~ D	TR	0.87	~~600.0+~~ 45.9	~~F*~~ D					
	Overall Intersection		**0.98**	**~~191.2~~ 95.0**	**F**	**-**	**1.00**	**~~212.9~~ 103.0**	**F**					
14. HOYT AVENUE SOUTH & 21ST STREET														
Hoyt Avenue South	EB	L	0.24	31.7	C	L	0.24	31.7	C	LTR	0.68	40.8	D	-Restripe EB approach of Hoyt Avenue South from one 11-ft exclusive left-turn lane and one 11-ft shared through-right lane to two 11-ft shared left-through-right lanes for 250 ft. -Modify signal timing: shift 3 s green time from EB phase to NB/SB phase [EB green time shifts from 37 s to 34 s; NB/SB green time shifts from 73 s to 76 s].
		TR	0.99	72.1	E	TR	0.99	72.1	E	-	-	-	-	
21st Street	NB	LTR	1.20+	~~286.8~~ 171.7	F	LTR	1.20+	~~325.9~~ 196.0	F*	LTR	1.20+	~~279.9~~ 157.7	F	
	SB	LTR	1.20+	185.2	F	LTR	1.20+	204.9	F*	LTR	1.20+	167.6	F	
	Overall Intersection		**1.20+**	**~~202.3~~ 160.9**	**F**	**-**	**1.20+**	**~~226.8~~ 179.5**	**F**	**-**	**1.12**	**~~188.6~~ 144.2**	**F**	

Notes:
(1) Control delay is measured in seconds per vehicle.
(2) Overall intersection V/C ratio is the critical lane groups' V/C ratio.
* Denotes a significant impact.

TRANSIT

As discussed in Chapter 14, "Transportation," the proposed project would not result in any significant adverse subway station or tramway impacts in either the 2018 or 2038 analysis year. However, it would result in significant adverse impacts to bus line-haul levels for the Q102 bus and the Red Bus. In the eastbound and westbound directions the Q102 bus route would experience significant adverse impacts during the PM peak period in the 2018 analysis year and during both the AM and PM peak period in the 2038 analysis year. The Red Bus route would also result in significant adverse impacts to bus line-haul levels for the southbound direction in the AM peak period and the northbound direction in the PM peak period during the 2038 analysis year. Potential measures to mitigate these significant adverse impacts are described below.

BUS LINE HAUL

The proposed project would result in significant adverse bus line-haul impacts on the Q102 route under 2018 Phase 1 and to both the Q102 and Red Bus routes under 2038 Full Build conditions. Under Phase 1-2018, during the PM peak period, the eastbound Q102 would exceed the NYCT guideline capacity. Under Full Build-2038, during the AM and PM peak periods, both the eastbound and westbound Q102

would exceed the guideline capacity while the Red Bus would exceed the RIOC guideline capacity in the southbound and northbound directions during the AM and PM peak periods.

Table 22-4 provides comparisons of existing service and the number of buses required to fully mitigate the identified significant adverse line-haul impacts along the Q102 bus route under Phase 1 and the Q102 and Red Bus route under Full Build of the project. The Full Build-2038 mitigation accounts for all buses needed to accommodate the 2038 projected passenger volumes independent of the Phase 1-2038 mitigation. NYCT and RIOC routinely monitors changes in bus ridership and makes the necessary service adjustments where warranted.

Table 22-4
Mitigated Future With Action Condition (Capacity Improvement): Bus Line Haul Levels

Analysis Year	Route	Peak Period	Eastbound/Northbound Buses per Hour		Westbound/Southbound Buses per Hour	
			Existing	Mitigation	Existing	Mitigation
2018	Q102	AM	4	n/a	3	n/a
		PM	2	3	2	n/a
2038	Q102	AM	4	6	3	5
		PM	2	7	2	6
2038	Red Bus	AM	8	n/a	8	10
		PM	8	9	8	n/a

Notes: The Q102 bus route operates standard buses with a guideline capacity of 54 passengers per bus and the Red Bus route operates with a guideline capacity of 55 passengers per bus.

PEDESTRIANS

PHASE 1-2018 ANALYSIS YEAR (2018 WITH ACTION CONDITION)

The proposed project would not result in any significant adverse impacts on pedestrian operations.

FULL BUILD-2038 ANALYSIS YEAR (2038 WITH ACTION CONDITION)

Under Full Build-2038, the proposed project would result in significant adverse pedestrian impacts at the following locations on West Road and West Main Street:

- West Road: The east sidewalk between West Main Street and the subway station; and
- West Main Street: The east sidewalk between the Tram Station West bus stop and the Queensboro Bridge.

West Road between West Main Street and Subway Station

At this location, the east sidewalk would experience the following changes:

- LOS B (1.65 PMF) under the No Action condition to LOS D (9.28 PMF) under the With Action condition during the AM peak period;
- LOS B (1.01 PMF) under the No Action condition to LOS D (7.06 PMF) under the With Action condition during the midday peak period; and
- LOS B (2.72 PMF) under the No Action condition to LOS D (11.48 PMF) under the With Action condition during the PM peak periods.

The significant adverse impacts at this sidewalk would be fully mitigated by widening its existing width of 6.4 feet to 8.9 feet, thereby increasing its effective width from 2.7 feet to 5.2 feet.

West Main Street between the Tram Station West Bus Stop and Queensboro Bridge

At this location, the east sidewalk would experience the following changes:

- LOS B (1.20 PMF) under the No Action condition to LOS D (7.06 PMF) under the With Action condition during the AM peak period; and
- LOS B (1.78 PMF) under the No Action condition to LOS D (8.52 PMF) under the With Action condition during the PM peak period.

The significant adverse impacts at this sidewalk would be fully mitigated by widening its existing width of 6.4 feet to 8.0 feet, thereby increasing its effective width from 3.6 feet to 5.2 feet. The measures described above, which have been determined to be feasible, and the mitigated conditions are summarized in **Table 22-5**. ~~In the event the proposed sidewalk widening is determined to be infeasible, the projected impacts would be deemed unmitigatable.~~

Table 22-5
2038 No Action, With Action, and Mitigated Conditions
Pedestrian Level of Service Analysis

Location	Mitigation Measures	Existing Effective Width (ft.)	No Action		With Action		Proposed Effective Width (ft.)	With Mitigation	
			PMF	LOS	PMF	LOS		PMF	LOS
Weekday PM Peak 15-Minutes									
West Road, between West Main Street and the Subway Station- East Sidewalk	Sidewalk widening by 2.5 feet	2.7	2.72	B	11.48	D	5.2	5.96	C
West Main Street between the Tram Station West Bus Stop and Queensboro Bridge- East Sidewalk	Sidewalk widening by 1.6 feet	3.6	1.78	B	8.52	D	5.2	5.90	C

Note: PMF = pedestrians per minute per foot.

EFFECTS OF TRAFFIC MITIGATIONS ON PEDESTRIAN OPERATIONS

As previously described, intersection operations would be improved with the implementation of the recommended traffic mitigation measures. These measures would include changes to existing signal timings, installation of new signals, and modifications to lane utilization. A review of the effects of these changes on pedestrian circulation and levels of service showed that they would not alter the conclusions made for the pedestrian impact analyses, nor would they result in the potential for any additional significant adverse pedestrian impacts.

At the newly signalized (per traffic mitigation) intersection of Main Street and West Road, a pedestrian crosswalk analysis was conducted to determine if the proposed intersection reconfiguration and signal timing would continue to adequately accommodate pedestrian crossing at the intersection. As shown in **Table 22-6,** the traffic mitigation measures recommended for this intersection would not result in any significant adverse pedestrian impacts.

MITIGATION IMPLEMENTATION

Subject to approvals of the relevant agencies, including NYCDOT, RIOC, and NYCT, the recommended mitigation measures would be implemented to mitigate the projected significant adverse transportation impacts at the completion of the project's Phase 1-2018 and Full Build-2038 conditions. However, between Phase 1-2018 and Full Build-2038 conditions, Cornell will

coordinate the implementation schedule for traffic mitigation measures shown above for 2038 conditions with RIOC and NYCDOT.

Table 22-6
2038 With Action Condition Crosswalk Analysis with Traffic Mitigation

Location	Crosswalk	Street Width (feet)	Crosswalk Width (feet)	Conditions with conflicting vehicles					
				AM		Midday		PM	
				SFP	LOS	SFP	LOS	SFP	LOS
Main Street and West Road	West	27.5	12.0	49.9	B	40.0	C	39.1	C
	Northeast	35.5	12.0	104.5	A	212.6	A	206.8	A
Note: SFP = square feet per pedestrian.									

D. CONSTRUCTION

The analysis undertaken in Chapter 20, "Construction," concludes that the proposed project would result in significant adverse construction impacts related to transportation and noise (i.e., construction noise impacts on open space).

TRANSPORTATION

During Phase 1 construction of the proposed project, significant adverse impacts are expected for traffic and transit conditions. During Phase 2 construction, significant adverse impacts are expected for traffic, transit, and pedestrian conditions. These findings are summarized below.

TRAFFIC

Four intersections (of the seven analyzed) would experience significant adverse traffic impacts during Phase 1 construction. Impacts at three of the ~~two of the four~~ intersections could be mitigated using standard mitigation measures typically implemented by NYCDOT. Significant impacts at one location could only be partially mitigated. These measures would also be ~~consistent with~~ similar to those proposed to mitigate the intersection impacts associated with the project's build-out and occupancy. ~~Two impacts are currently identified as unmitigatable, but additional review of potential mitigation measures will be undertaken for the Final EIS that may fully or partially mitigate these significant impacts.~~

For Phase 2 construction, the cumulative operational and construction traffic would be of lower magnitudes than what the overall project would generate when completed in 2038. Therefore, potential traffic impacts during peak Phase 2 construction would be within the envelope of significant adverse traffic impacts identified for the 2038 With Action condition in Chapter 14, "Transportation," and mitigatable and unmitigatable impacts identified above would apply to Phase 2 construction conditions as well. The required mitigation measures for those locations that could be mitigated are expected to be part of those presented for the 2038 full build-out of the proposed project. These mitigation measures could be implemented at the discretion of NYCDOT during construction of Phase 2.

TRANSIT

During construction of Phase 1, because most construction workers parking at the Motorgate garage would rely on the Red Bus for travel to/from the project site, during off-peak hours when the Red Bus operates at comparatively lower frequencies, there is a potential for a line-haul

impact on the Red Bus that would warrant an increase in its service during off-peak hours (i.e., three additional buses during the 6 to 7 AM and 3 to 4 PM construction peak hours). Cornell has committed to fund the operating costs associated with providing additional Red Bus service if project activity adversely impacts the Red Bus service during the construction period.

A significant adverse impact has been identified for the Q102 bus route due to the projected increase in demand from the completed buildings, and this impact would continue during the Phase 2 construction period. Mitigation measures identified above for the operational impact would be proposed to mitigate the construction-period impact.

PEDESTRIANS

Pedestrian trips generated by construction workers are not expected to result in significant adverse pedestrian impacts during Phase 1 construction. After the completion of the Phase 1 and Phase 2A components of the proposed project, the combination of the Phase 2 construction worker pedestrian trips with those generated by the completed Phase 1 and Phase 2A buildings during the commuter peak hours may result in similar significant adverse pedestrian impacts as those discussed in Chapter 14, "Transportation," and may warrant the earlier implementation of the recommended sidewalk widening described above. ~~In the event the widening is determined to be infeasible, the projected impacts would be deemed unmitigatable.~~

NOISE IMPACTS ON OPEN SPACE

The proposed project would result in significant adverse impacts with respect to construction noise, as follows:

- During construction of Phase 1, the open space areas along Main Street would experience exceedances due to trucks and workers travelling on Main Street to and from the project site during the AM construction traffic peak hour (6 to 7 AM);
- During construction of Phase 2, South Point Park and the waterfront promenades on the east and west sides of the Island adjacent to the project site would experience noise levels in the mid to high 70s of dBA for over 24 months. These exceedances would be due to the operation of on-site construction equipment.

No practical and feasible mitigation measures have been identified that could be implemented to reduce noise levels to below the 55 dBA $L_{10(1)}$ guideline within the impacted open space areas (i.e., the open spaces along Main Street, the waterfront promenade, or South Point Park). Noise levels in these spaces would exceed the 55 dBA $L_{10(1)}$ noise level recommended for outdoor areas requiring serenity and quiet by the *CEQR Technical Manual* noise exposure guidelines. However while the 55 dBA $L_{10(1)}$ guideline is a worthwhile goal for outdoor areas requiring serenity and quiet, due to the level of activity present at most New York City open space areas and parks (except for areas far away from traffic and other typical urban activities) this relatively low noise level is often not achieved. For example, existing noise levels at the waterfront promenade and South Point Park are already above the 55 dBA $L_{10(1)}$ guideline due to noise from vehicular traffic on the Queensboro Bridge and on the FDR Drive. To achieve noise levels that would meet the 55 dBA $L_{10(1)}$ guideline, measures would need to be implemented to control noise from the Queensboro Bridge; the implementation of such barriers on the bridge would not be possible because of the bridge's landmarked status. ✷